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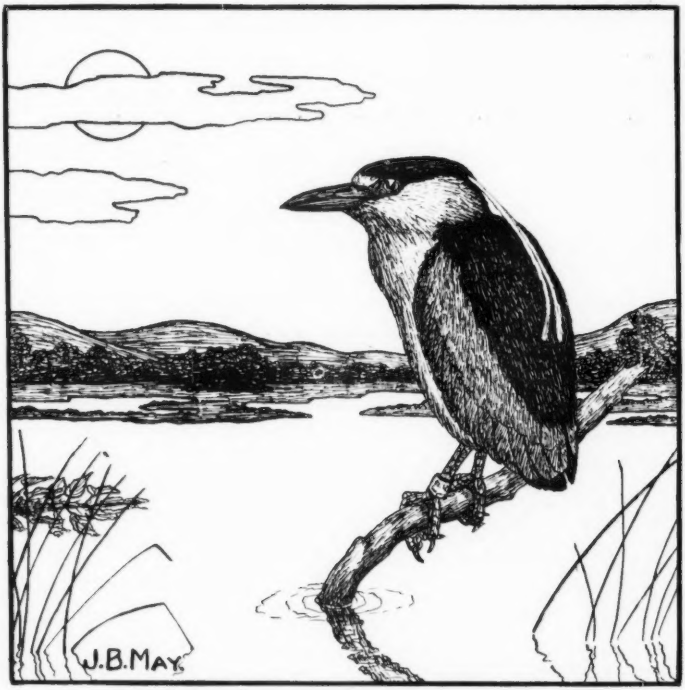
BIRD-BANDING

A Journal of Ornithological Investigation

Vol. VI January, 1935 No. 1



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THE INLAND BIRD-BANDING ASSOCIATION

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VOL. VI. JANUARY, 1935 No 1

A COMPARISON OF WINTER AND SUMMER TERRITORIES AND SEASONAL VARIATIONS OF THE TREE SPARROW (*Spizella a. arborea*)[1]

By A. MARGUERITE HEYDWEILLER

IN a recent issue of *Bird-Banding* (Vol. V, No. 1, Jan., 1934) I sketched briefly the results of a winter's study of the Tree Sparrows about Ithaca, New York, tracing their meanderings by means of colored chicken feathers which were glued to the base of their tails with Duco household cement. During the past winter (1933–1934) this study was extended, with larger traps which could be kept in operation continuously, with more stations, and with a different-colored feather for each bird.

A word first on this method of marking birds. I experimented this year with two coloring-agents, Diamond dyes and artists' oil colors. With the oil paints I was able to create a glorious assemblage, marking the tips or centers of the feathers with various and sundry colors. The colors were permanent enough, but I discovered to my sorrow that in the course of a month or so the feathers themselves wore off. The stiffness of the paint made them brittle, and by the end of the season I was identifying these birds—if at all—by the characteristic shape of the plume. A few combinations remained entire and identifiable, but whether by chance or because of inherent superiority of colors I am not certain. The most successful plumes on the whole, I have decided, are those which are thoroughly boiled in Diamond dyes, insuring both permanence and distinctness of colors.

The method itself has its limitations. For a winter's study I found it admirable. The feather apparently does not disturb the bird; if carefully selected and applied it will stick as long as the tail does; and the feathers are certainly more conspicuous than the tiny celluloid bands in use at many banding stations. On the other hand, it is not permanent, since, of course, it disappears with the molt, and the study must consequently be limited to a single year. Caution must also be employed in marking nesting birds in this way. With nesting Tree Sparrows in Canada I had no trouble whatever;

[1]Read at the 52d annual meeting of the American Ornithologists' Union at Chicago, Illinois, October, 1934.

they flirted their tails a few minutes and returned dutifully to their respective nests. Another student at Cornell, Mr. V. E. Gould, experimented with the Kingfisher with results which were not so happy, resulting in every case in desertion of the nest. With young birds I again found the method impossible. Since they left the nest before their tails appeared, I attempted to glue small pieces to the contour feathers of the back; to no avail, for these feathers, besides being extremely soft and loose, are the first to molt, even before the bird is full grown.

WINTER TERRITORIES

During the winter, however, I tramped my marshes and plotted my gay "birds of paradise" each on an individual map. And I discovered that Tree Sparrows are apt to wander more frequently and over a wider area than I had realized last year, when all the birds from one station were marked identically. In all I handled 77 birds, of which 21 were returns from last winter (a 34 per cent return ratio), and 13 had previously been banded by Dr. A. C. Fraser three fifths of a mile from my station. The accompanying Map I will illustrate the relationships of my various stations and the territories of typical individuals.

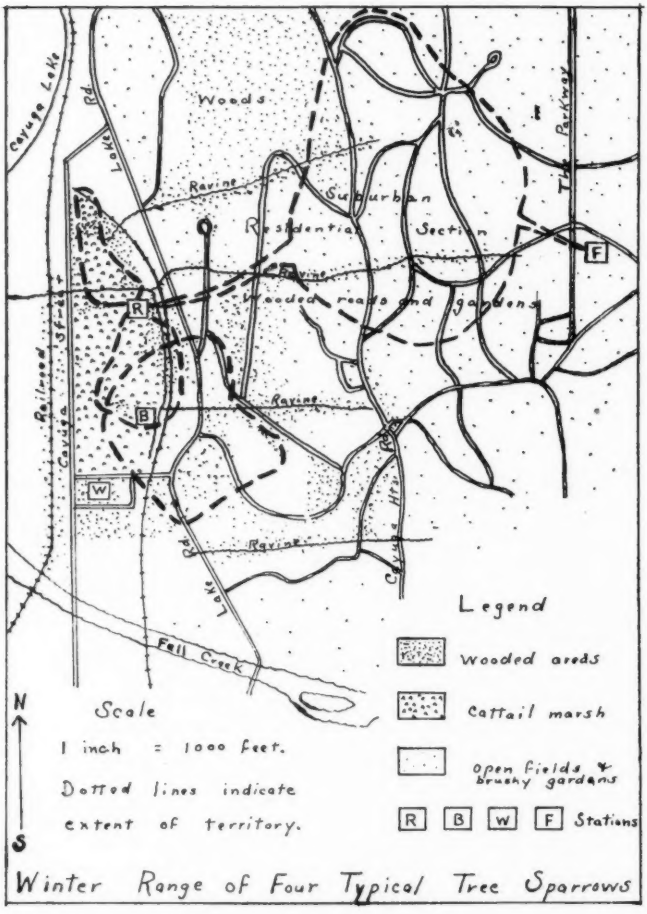
In determining the range of these birds I have measured the distance between the two farthest points on their individual maps—presumably the diameter of their territories. Within a 1,000-foot diameter were 38 birds, and within a 2,000-foot diameter there were 21 individuals. This includes the majority. Between 2,000 and 2,500 feet there were only four birds. But then comes an interesting list of 17 individuals, besides some 14 sight records from townsfolk—which range from 3,000 to 6,800 feet, averaging 4,000 feet. Mr. Daniel Smiley of Lake Mohonk likewise writes me of two of his birds which he recaptured 6,800 feet from the original station. These cases are too many to rank as accidentals. Obviously the final statement of the extent of wintering territory of the Tree Sparrow must include these wanderers as a vital part of the whole.

The histories of some of these individuals may reveal why return ratios at banding stations are not higher. I have classified them under four general headings:

1. Timid individuals who, although they were plotted constantly within the normal range from the station (1,000 feet), never were taken in the traps after the initial banding.

2. Wanderers who cover so large an area that they happen only once or twice into a trap and may miss it entirely another year.

3. Regular residents of one locality who meandered once into a bander's trap out of the normal territory. B175874, for example, banded by Dr. Fraser in 1932, never returned, yet in 1934 I observed him constantly throughout the winter at one of my stations. Neither migration nor mortality can be blamed for that failure to return; he simply did not belong there. Another individual whose activities puzzled me at first was given band B129589 by Dr. Fraser in 1930.


Cayuga Lake
Woods
Lake Rd
Ravine
Suburban
Residential
Section
Thruway
F
Ravine
Wooded roads and gardens
R
Railroad
Cayuga St
B
Ravine
W
Lake Rd
Cayuga Hts Rd
Ravine
Fall Creek
N
S
Scale
1 inch = 1000 feet.
Dotted lines indicate
extent of territory.
Legend
Wooded areas
Cattail marsh
open fields & brushy gardens
R B W F Stations
Winter Range of Four Typical Tree Sparrows

Map I

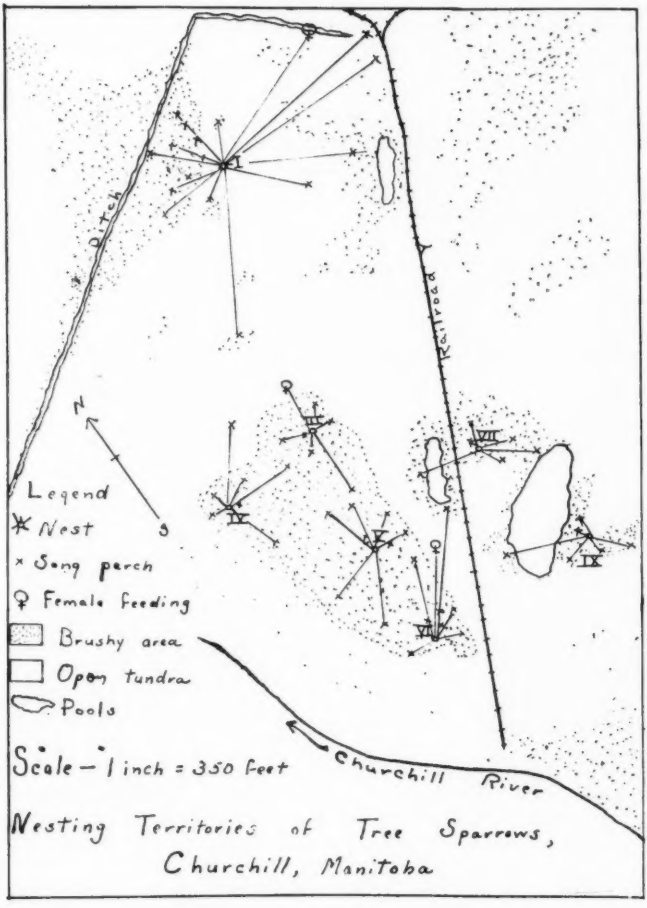
I took him once in 1934, and applied a red and a yellow feather to his tail. He never returned to either station, but in the following weeks the Department telephone rang steadily with reports of this bizarre creature who was wandering into every back yard between the two stations.

4. Emigrants who shift their territory from year to year. In no other way can I account for B175869, who repeated constantly at Dr. Fraser's station in 1932, apparently moved to Renwick in 1933, and returned there for the 1934 season. Another striking example of this type was C118623, banded in 1933. He repeated regularly until he was transported to a point fifty miles from Ithaca. He never returned, but in 1934 I chanced to collect him out of a flock of some two hundred birds three and one half miles from the banding station.

With the wanderlust so prevalent among the Tree Sparrows it is impossible to attribute to them a uniform group habit. The flocks which I observed were made up one day of one personnel, at another time of several additions and a few absentees, or split into several small groups. Frequently a bird whom I had established in one group appeared next day in an entirely new flock.

On the whole, however, there seemed to be two *sets* of flocks, inhabiting the territory around my two stations, one at either end of the marsh. While I commonly found single individuals out of their territory, I never recorded an entire flock, even of only three or four birds, beyond their area. There was a more or less definite line through the marsh at which the group invariably circled back. I tried to explain away this phenomenon, I tried to find exceptions and overlap and I searched the middle territory repeatedly for combinations, but the line remained. The food at the stations was not, I believe, a factor in determining their territory, for only one of the stations was kept in operation continuously; and, moreover, there were many days when the ground was bare and most of the birds ignored my tempting assortment of chick-feed and crumbs.

Their nocturnal behavior was equally distinct. With the assistance of several of my friends, I patrolled the marsh at dusk on several evenings, and determined the roosting-places of the groups. The birds were released from the Renwick and Bergholz stations simultaneously, while observers out in the marsh watched where they settled. The Renwick birds spread over the north end of the marsh, the Bergholz birds at the south end. The one or two Renwick birds that had been visiting their Bergholz cousins that day settled with them for the night. Through the middle of the marsh was an area untenanted. After dark we tramped assiduously, and flushed birds throughout the areas north and south, but none from the central strip. These birds always scuttled out singly almost under foot, from the clumps of dead grass and cat-tails. In areas where there are pine woods the birds apparently show a preference for such cover. Mr. Wendell P. Smith and Mr. C. L. Whittle inform me


Dirt Rd.
Railroad
N
Legend
Nest
Song perch
Female feeding
Brushy area
Open tundra
Pools
Scale — 1 inch = 350 feet
Churchill River
Nesting Territories of Tree Sparrows,
Churchill, Manitoba

Map II

that their Tree Sparrows fly toward the pines at dusk, and recently I flushed a bird from the center of a dense young white pine, about three feet from the ground. Although it was after dark, the size of the bird, the flash of light edgings of the tail feathers, and the characteristic chip of alarm made identification reasonably certain.

HOMING INSTINCT

In 1933 I attempted to determine the power of the homing instinct in these birds by transporting them to various distances from the station. Six birds carried from one to five miles from their station returned within a week. A five-mile bird was back in the traps the following morning. One individual transported ten miles covered the intervening fields in sixteen days. Beyond ten miles I had a hundred per cent loss. The eight birds released on March 3d from seventeen to one hundred and fifteen miles from Ithaca apparently began their spring migration from that point. Hoping that an earlier transportation would give them more time to return, I tried again in 1934. On February 2d six birds were dropped fifty and one hundred miles northwest of Ithaca. My record still stands at a hundred per cent loss. However, the return of two of the eight 1933 subjects is interesting in itself. A third was the stray C118623 collected three and one half miles from the station.

SUMMER TERRITORIES

With the melting of the snows in late March and April the little flocks of Tree Sparrows melted inconspicuously from their winter territories. Fewer and fewer of the familiar plumes appeared at the traps, nor could they be located in their accustomed haunts in the marshes. The spring migration was on, and for two summers it was my privilege to follow this species to its breeding grounds in the Far North. Churchill, Manitoba, eight hundred miles north of Winnipeg on Hudson Bay, was made accessible by rail in 1929, and there on the edge of timberline, where this is one of the most abundant species, I was able to trace the complete nesting cycle of the Tree Sparrow.

My first nest was found the first day in the field, June 5, 1933. Although completely lined with soft white ptarmigan feathers, it was apparently a premature attempt, for during the ensuing week of almost constant sleet and snow the birds had little to do with it. The first egg was not laid until June 11th, and even that was fully a week ahead of the majority of my nests. By the 21st, however, (which is considered the first day of spring in the north) incubation was well under way. My latest nest had its complement of five eggs on June 29th.

It was interesting to compare the territory of these nesting pairs with that of winter birds. The females were easily captured and marked with the gay chicken feathers by placing a wire box trap over the nest, from which the eggs had been removed to avoid breaking. Males could be taken after the young hatched, at which

time they took an active part in duties about the home. As would be expected, the territory was found to be considerably more limited than their winter ranging. In a crowded area like the 300-by-800-foot patch of brush that harbored four nests, the song perches of the males included a territory only 200-to-300 feet in diameter. A more isolated nest such as No. 1 of 1933, on the other hand, was surrounded by a territory some 600 to 700 feet in diameter. In Map II, I have diagrammed these areas, indicating a few of the outlying song perches.

During the twelve to thirteen days of incubation I never saw the female more than 450 feet from her eggs. While the young were in the nest, both parents gleaned food from the tiny birch and willow leaves and the thick tangle of low branches, frequently only ten to fifteen feet from their charges. Throughout the latter part of July and most of the month of August the gay plumes waved from the same little territory of 200 to 300 feet in diameter, and the young scuttled among the underbrush well out of sight.

It was not until the 19th of August that the birds emerged from the thick cover. Whereas they had previously been confined to the areas of brushy willows and birches, they flushed now wherever we walked. Across the grasses and moss of the river flats they rose at every step, little flocks of young and adults of whose affairs I know nothing except that they were strangers there. The familiar beplumed birds were gone—the plumes were probably lost in the molt, but the Biological Survey bands with which they were also labelled were likewise not to be found on the birds that now invaded the area studied.

Development of Young Compared with Southern Sparrows

By the 19th of August the young birds finally shift for themselves. Already it is autumn in this northern land and there is no time for a second brood. If the Tree Sparrow is to maintain its numbers it must lump its progeny into one family. Thus we find five the normal number of eggs in a nest and, frequently six, as compared with the three or four of their more southern relatives, the Chipping and Field Sparrows, as well as most of the other Fringillids. But if the season is short, is the length of day ample compensation? During June and early July there is no complete darkness. The light fades about 10:30, but there is a continuous glow on the northern horizon and the night is nearer dusk than midnight. By 2 A.M. it is broad daylight again, and activities commence about a quarter of three, continuing steadily until nearly 9 P.M. At every hour and at practically every age at which I have observed this species, I have found the intervals between feedings to average about three minutes—or twenty visits per hour, one or two young at a time being fed. Compare this seventeen-and-a-half hour day, with 350 feedings divided among five youngsters, with the figures on the Song Sparrow contained in the thesis of Miss Doris Haldeman at

Cornell University in 1929—a working day of fourteen and three quarters hours, with 261 feedings among three young. I have no data on the Field and Chipping Sparrows in this regard, and must assume that they are very similar. The age at which the young leave the nest reveals whether or not the longer day balances the demands of a larger family. Among the southern species, the Song Sparrow has been found ready to move at the age of seven days, the Field Sparrow at about seven and three quarters days. The young Tree Sparrows, though they will scatter at the age of eight days if molested, normally remain in the nest nine and one half days. At this age they are unable as yet to fly, simply hopping out of the little cavity in the tussock of moss which cradles their nest. I frequently wondered if an elevated nest would be emptied as soon, and was able to check this last summer, when I found a nest in a little spruce some miles back from Churchill. It was fully five feet above the ground, which I believe is the highest nest I have ever seen recorded. The young I estimated to be five days old. When I returned four days later, the nest was empty. I flushed the adults and heard the young peeping in the brush some one hundred and fifty feet away, so that I am assured of their safe departure.

Sex Differentiation by Measurements

By a second method of procedure—systematic collecting from a flock a few miles away—I hoped to determine some way of differentiating the sexes at my stations by external means. In summer I had no difficulty, simply from their characteristic attitudes and behavior about the nest. But in winter, though I have handled some one hundred and fifty specimens, I am still baffled. The females average slightly smaller and lighter, sometimes duller, than the males, but overlap of measurements and individual variation are so prevalent that a guess is in the end only a guess and no more. After long and careful comparison of birds whose sexes I knew, I was able to guess correctly on unknowns about seventy-five per cent of the time. The most diagnostic character I was able to find was an infinitesimal difference in the width of the crown-patch, which seems to be slightly broader in the males. But here again there is no absolute diagnostic character, and I should hesitate seriously before I separated the sexes at my station on their external appearance.

Relation of Sexes

My studies yielded other data of greater import. The continually larger proportion of males eventually took on a significance beyond mere chance, and I began a drastic collecting campaign throughout February, March, and April that netted me some ten birds a week. I regret that I have only scattered records during the fall migration and early winter, but hope to complete the story this year. The proportions of the sexes, so far as I have data, are striking. During February and March males exceeded females two to one; with the

first week in April the pendulum swung abruptly to the side of the females, with three to every male. By May there were only five or six scattered individuals left, and only one, a female, was collected. The amount of singing—by which is meant the true summer song rather than the twittering note of the winter flock—corresponds also with these movements. The hedgerows rang with the clear little warble throughout March. During April there were a few singing until the 18th, thereafter none, although two males were collected as late as the 26th.

There is one striking discrepancy in my notes: on April 15th, in the full swing of the female migration, I collected a dozen birds from a flock of thirty or forty at a point twenty miles due north of Ithaca which had a proportion of three to one in favor of the males, and with weights that compared with an average of two weeks earlier at Ithaca. Could a short twenty miles delay migration two whole weeks, or do these birds perhaps represent the migration of the first-year birds?

It appears, then, that the majority of the females continue farther south to winter, though the fall migration (as far as I have collected material) brings adults and immature birds of both sexes together and in about equal proportions. But where do these females establish themselves? I wrote to all the leading museums of the country for lists of dates and sexes of their specimens, with the hope of plotting a graph that would show progressive increase and decrease of the sexes northward and southward during the non-migratory winter months. This period I arbitrarily limited by the dates December 20th and March 1st. I discovered, however, a marked paucity of Tree Sparrows in museum collections. Many museums had no material at all, and very few had specimens in sufficient quantities to offset the elements of chance and error. However, everywhere there appeared to be the same predominance of males, both in winter and in migration. It is encouraging to find on the northern limit of its range, in Ontario for example, sixteen males and no females. On the other hand it is rather surprising to find almost as many females as males in Nova Scotia and Massachusetts, two lone females in Montana, and two stray males in Texas.

Seasonal Variation in Weight

A series of weighings throughout the year displays an interesting curve which correlates strikingly with the activities of the bird. My figures are still incomplete for some of the cycles, but I shall attempt to sketch briefly the high lights.

At the age of two weeks we find the young, with tails half grown, balancing the scales evenly with their parents, and the fully fledged juvenals throughout August average slightly heavier. The adults during July and early August are at their lowest ebb, averaging 17.3 and 16.5 grams for males and females respectively. The abrupt decrease in weight of almost twenty per cent for the males and ten

per cent for the females with the advent of the young is followed by an equally startling increase as soon as the youngsters begin to shift for themselves about the third week in August.

Some of this weight is lost in the subsequent migration, and maximum figures are not attained again until just preceding the spring departure during the first two weeks in March. At this time the males average 21.23 grams, the females 20.2 grams. Both males and females of late March and throughout April are some ten per cent lighter. Again the question arises whether this phenomenon is due to an influx of younger birds or to the hardships of migration

MOLT

In the course of my collecting I had occasion to observe a spring molt that was more extensive than is generally accredited to the Tree Sparrow. It is an established fact that there is a partial molt about the head at this season, and practically every specimen that I examined showed fresh quills about the cheeks, chin, and throat. I also found occasional quills on every tract on the body, and several cases where the entire crown and dorsal tract were heavily sheathed, the feathers being as bright and fresh as on an October migrant. I first noticed this molt about the third week in March, and I traced it on both sexes throughout April. The last specimens collected, three females on April 30th and one on May 3d, showed only faint vestiges of quills about the head.

During August a large series of skins was made in an effort to trace the molt of both adult and juvenal birds. None of the July young were full grown; the weights averaged about sixteen grams and the tails were about two thirds their ultimate length, though the backs were already showing an occasional rufous-edged feather of winter.

On August 1st and 2d we found them fully fledged, though still a part of a family group. The upper back feathers were bright and heavily sheathed, quills bristled from every tract, and a few buffy feathers appeared on the sides of the belly. A few rufous feather were growing into the brown streaking of the crown.

On August 17th and 19th a series of sixteen exhibited every stage from full juvenal to practically complete first-winter plumage. The most advanced of these showed the back and head completely in winter dress, though nape and throat were still clothed in the soft, streaked plumage of the juvenal, and there were one or two scattered touches of dark on the sides and belly.

Among the adults the first evidence of molt was found on July 31st in 1933; this year on August 3d I noted a few scattered quills among the contour feathers. On the 5th there were three new quills among the primaries, and the wing-coverts were entirely lacking.

Seven specimens taken on the 19th were in complete winter plumage on dorsal and ventral tracts, though bases of the feathers were still heavily sheathed. Some of the heads showed strikingly both

old and new feathers. The napes were invariably still worn and dull, and apparently were the last region to be affected, as in the young also. Tails and wings were incomplete.

There is a gap in my Tree Sparrow records between my departure from Churchill on the 21st of August and the arrival of the first birds in Ithaca the 28th of October, at which time the young and old are alike resplendent in their fresh plumage of chestnut, buff, and black.

Cornell University, Ithaca, New York.

SEASONAL AND INDIVIDUAL VARIATIONS IN HOUSE SPARROWS

By J. T. NICHOLS

THE sequence of plumages in the House Sparrow (*Passer d. domesticus*) by molt and wear, and the fact that the bill of the male is black in summer, are well and generally known. But in banding a good many individuals, this or that variation in bill-color or plumage has caught my interest, and I have some two hundred and seventy-five more or less fragmentary memoranda concerning the subject. Arranging and studying this material, I find three things: that the series of observations bearing on a given point is usually regrettably small, that I am in a better position to make further observations of interest, and that I am in the possession of some details and suggestions that seem worth recording.

BILL-COLOR OF ADULT HOUSE SPARROWS

I find no color difference in October between the bill of the male and that of the female. The upper mandible is brownish gray, sometimes lighter and sometimes darker. The lower mandible is variously pale, sometimes quite pale to the tip, sometimes merely paler at its base. There is almost always yellowish on the base of the bill adjacent to the rictus, which varies from a restricted faint tinge of yellowish to an appreciable area of yellow. This is a lemon yellow, to my eye identical with that of the conspicuous yellow skin of the rictus of a young bird, with which it possibly has some biological correlation, and quite unlike the more buffy yellow of the lower mandible of some juvenals. No yellow noted in one of twelve memoranda on males and in two of twelve on females. The bill of this aberrant male approached the summer color somewhat, being dark gray only slightly paler on base of lower mandible. To match it there is an October female with nearly uniform gray bill with a very slight yellowish touch near the corner of the mouth.

In November, three out of eleven males had uniformly dark gray

or blackish bills; one on November 23d was uniformly blackish. But taking November and December together, seventeen out of twenty-two had gray and pale bills, with the yellow near rictus if anything better developed than in October, only one of these seventeen without yellow or yellowish—gray, base of lower mandible 'somewhat paler.' The change to a black bill color seems to consist of gradual and general deepening of the gray and restriction of the pale base of the lower mandible.

The earliest male examined with a solid-black bill was on December 3d, and in December two out of eleven had such, and the remainder had bills approximating those of fall birds. In January to February 3d, when the last without a solid-black bill was examined, on the other hand, three out of eight had black bills, and in the other five the bill varied from uniform blackish or grayish black to dark gray with base of lower mandible somewhat paler; none with any yellowish.

From February 7th to June 15th the bill of males is solid black. This is based on six memoranda of birds handled in February, twelve in March, seventeen in April, sixteen in May, and five in June, and on continued casual observation in spring and summer.

Whereas the bill of the male turns black in late fall and winter, there is no noticeable seasonal difference in that of the female, which is equally variable throughout the year. There may be a slight tendency for it to darken, however, for eleven out of sixty unusually dark-billed females have been noted from February 7th to June 15th, when bills of all the males examined were black, as against one out of twelve in October.

One of the oldest birds, so proved by definite return data, is a female banded as an adult on May 13, 1930, and collected on May 14, 1932, at least three years old in 1932, when it had dark throat-patch faintly indicated, bill gray, lower mandible pale except tip, base of bill pale, very slightly yellowish, marked off in front by a dark area on upper mandible and dark sub-basal streak across lower mandible. It had a broken leg, was in good flesh, with ovaries moderate, but was non-breeding. A pale area on base of bill in the female well defined in front, or else delimited there by a dark bar, seems to be correlated with age. It has been noted in nine cases including the above, all from May 1st to June 10th, six with the bar and three without. Two without, returns A189562 and A189519 of May 1st and 9th, 1931, banded respectively on May 25th and May 13th, 1930 as adults, were at least two years old in 1931. Two with the bar (on the lower mandible), and pale area behind delimited by it not otherwise well defined—repeats B139630 and B139618 of May 24th and June 10th, 1931—were banded respectively as adults on May 11th and April 24th when the bar, if present, was at least overlooked in describing their bills.

First-year females may have somewhat paler bills than older birds, as two or three such retaken from November 14th to May 13th

following the summer they were juvenals, had bills paler than normal. Many females with such paler bills may be in their first adult summer, but not all, as a female banded as an adult on May 31st had a rather pale bill on June 10th of the succeeding year. A male juvenal of May had a black bill the following February 7th and one of August had a black bill the following April 5th.

Four males with normal gray, pale, and yellowish fall bills from October 3d to November 6th were retaken as follows: two the following February 26th to March 7th with black bills; one on January 11th (a year later) with an entirely blackish bill; and one the following February 3d with a grayish-black bill, the base of lower mandible being somewhat paler. No black-billed male has so far been retaken with a pale bill, though two such have returned in late January, when all males did not yet have black bills. There is no question in my mind that bills regularly turn from black to pale in late summer or early fall, and I therefore take this as evidence, which is not lacking from other sources, that males are trapped with less difficulty when in nuptial condition. No adult male House Sparrows whatever have been trapped between June 19th and September 29th, 1931–34, on which latter date many or most of the birds of the year are indistinguishable from their elders.

VARIATION IN YOUNG HOUSE SPARROWS

Individual variation in the plumages of adult House Sparrows is relatively slight or infrequent. I have, however, noted a male in which the chestnut markings were unusually noticeable and the legs reddish, a female with a dark smoky suffusion of color which may have been natural, but perhaps was acquired, as it is by sparrows which frequent smoky London roofs.

Young birds in fresh, soft juvenal plumage are comparatively variable. At least three types of these are distinctive and of frequent occurrence:

A. A considerable proportion—just how large is uncertain, as for the most part no record was made of them—have plumage not noticeably different from the adult female, most of lower mandible varying from pale (like the female) to strong buffy yellowish.

B. The second type is characterized by a slight mark which is yet distinctive when attention is called to it, a narrow, sharply defined pale or whitish arched streak from the eye to the bill (nostril-ward). This was more or less regularly correlated with whiter under parts than usual, the whitish extending onto the cheeks, and a faint but evident dusky chin-and-throat patch, and noted in six or seven young birds out of sixteen trapped from June 9th to 17th, 1932. It was thought at the time to be the plumage of the juvenal male, but it probably has not that significance. A bird examined on July 19, 1934, had this same pale streak before the eye, the upper mandible light gray, lower pale, soles of feet not yellowish, and the pale band behind eye conspicuous.

C. Three young birds on June 22d, and two others on June 24, 1932, all of which may reasonably have belonged to one brood, were of a quite different type, the most conspicuous character of which was having dark color more or less restricting the yellowish of the lower mandible, especially on the middle of its sides. Correlated with this was a triangular area in front of eye uniform palish gray contrasting with the dark forehead, yellowish soles of the feet, never a suggestion of a dusky throat, and sometimes, at least, with gray cheeks and a pale mark below eye giving a slight eye-ring effect. Two birds examined June 29, 1932, one of which had also been trapped on June 23d, showed some tendency toward this type. Four birds in the trap together June 15, 1934, were all of this type, top and sides of bill dusky, its tip pale, lores pale grayish and with a slight "eye-ring" expression, tip of bill and soles of feet varying yellowish, yellower in two than in the other two. Three out of four young birds in the trap together on June 20th and three out of five taken on June 21, 1934, were of this type. One of the former with sides of bill particularly dark had its tip whitish. One of the latter was a dark bird with smoky head and breast contrasting with whitish belly, and another had the dusky area on sides of bill restricted. The two other birds on June 21st had gray upper and yellowish lower mandibles placing them in type A, one with very yellow lower mandible and soles of feet also yellowish. There is doubtless a correlation between color of mandible and soles of feet, but birds of type A with yellowish mandibles certainly do not always, and probably do not usually, have yellowish soles of feet. Such type-A birds are pretty surely connected by intermediate stages with type C.

The bunching of birds of types B and C in time lends plausibility to the hypothesis that each type represents a strain of relationship and is shared by brood-mates. With this hypothesis in mind let us suppose five young birds taken August 1st and 2d, 1934, to have been brood mates. All are more or less aberrant; they conform to no type and have but one, not very notable variant character running through all five—gray lores and a well marked pale post-ocular band—yet each shows resemblances to some other probably more than if it were taken at random. Is this to be interpreted as an exceptional heterozygous brood? The birds are: F113967, F113968, F113970, F113971, F113972. The most striking aberrant character, a dark breast contrasting with whitish belly, is noted in three—F113968, F113970, F113972. Two have type-C bill, but no yellowish on soles of feet, F113971 and F113972; neither has F113967 (a type-A bird with yellowish lower mandible) yellowish soles of feet. F113970 has a pale lower mandible, a trace of yellowish on base of bill which is almost unique in so young a bird, and a dusky chin; F113972 has a pale chin.

Two particularly aberrant birds examined are unique, though each is easily assignable to a type. The first of type A foreshadows the male plumage in that of the juvenal. It had a throat-patch quite

dusky and rather sharply defined, even spreading a little on breast; cheeks whitish; crown and a line back from eye dark with a conspicuous whitish mark above it, the latter passing backward into a broader short buffy band; no pale streak before eye; lower mandible particularly yellow. A type-C bird of August 23, 1934, had upper mandible and sides of lower mandible gray, lower mandible and tip of upper whitish; soles of feet somewhat yellowish; breast dark, throat a little paler, belly abruptly whitish, top and sides of head including lores dark with a small gray spot behind the nostrils.

The aberrant type-A bird foreshadowing the male plumage may be called a juvenal with 'progressive plumage,' but other variants do not seem to fall into the 'progressive' or 'retarded' plumage explanation (Mayr, 1933, *Amer. Mus. Novitates*, No. 666). They suggest several potential more or less complete and unlike patterns in House Sparrow heredity which crop out in young birds, less standardized than adults. Strangely enough, I find a white streak from eye to bill, obviously homologous with that in type-B birds, in normal males of *Passer jagoensis* from the Cape Verde Islands and its race *rufocinctus* of the South and East African mainland (specimens in the American Museum of Natural History).

ACQUISITION OF MALE PLUMAGE

Two birds banded as juvenals on July 6th and August 21st were retaken in male plumage on the October 21st and October 25th following. A third, thought to be an adult female when banded on August 14th was retaken as a male the following April 5th.

Six birds molting into male from juvenal plumage are noted from August 2d to September 27th. The chestnut shoulders seem to be the first conspicuously male plumage to appear (August 2d and 17th and September 2d); black feathers come in on the breast early. A bird on August 29th was in active molt with unequal tail, chestnut shoulders, black blotch on breast, and some male plumage about head. The black breast feathers are at first unveiled and into October one sees young males as conspicuously unlike more advanced birds in the black breast patch which may approach in completeness that of the summer adult, as in their juvenal plumage which persists elsewhere. By or before November 1st the molt seems to be completed and young and old are indistinguishable.

American Museum of Natural History, New York.

METHODS OF TRAPPING SHORE BIRDS[1]

By Seth H. Low

The principle which makes shore-bird-trapping possible was first employed by W. I. Lyons. It consists of erecting foot-high wire fences across natural feeding areas. Shore-birds move about extensively while feeding, and upon coming up against a fence are inclined to run along it rather than to fly over it. The fence, or lead, as it is called, guides the birds into the trap.

Originally large-mouthed pull-string traps were used, but they proved unsatisfactory for three reasons: the hauls were small, the trap had to be constantly watched, and the operation scared away the birds in the vicinity. For the same reasons throw-nets are not practicable. In the autumn of 1930 experimenting was begun with automatic traps made of ⅜-inch hardware cloth with funnel entrances of the type used in sparrow traps. But circular-shaped traps with wide, high entrances were soon found to be more efficient. With the adoption of the largest possible mesh the traps became very light and therefore relatively inconspicuous. These the sandpipers entered easily but in time they found their way out again. The birds would not readily pass from the trap into the funnel-entranced gathering-cages, which likewise failed to hold those that did enter. The problem was to allow the birds to pass as expeditiously as possible from the trap into the gathering-cage; and second, to devise a gathering-cage which would take and hold both Least Sandpipers and Greater Yellow-legs. The former problem was solved by erecting a guide to divert the birds circulating about in the trap into a cage which was as light or lighter than the trap itself. The second proved to be difficult, but a glance at the past season's banding will show that the difficulty has been pretty well overcome. The answer was an inclined plane or ramp.

The Two-Cell Trap

This is the simpler of the two traps to make. Diagram 1 shows the trap set up in relation to the gathering-cages and the leads. The trap is made in two sections: one (FGHIJ) is shown with a gathering-cage attached, the other (ABCDE) without a gathering-cage. Since the attachment of the gathering-cages is a secondary matter, every section is built after the plan of section ABCDE. Each section is built on a four-foot piece of 1 x 2-inch scantling which runs along the roof (CKAE). No other framework is needed if No. 18 gauge ¾-inch hexagonal-mesh wire is used to make the side. A piece two feet high and ten feet long will make the entire side (ABCDE) of one section. It is attached on the upper edge to the scantling at

[1]Contribution No. 19 from the Austin Ornithological Research Station.

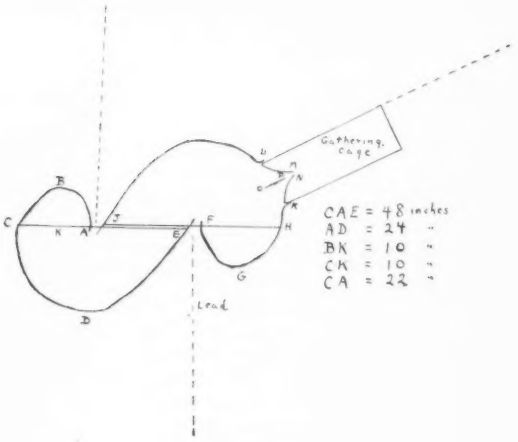


Diagram I.
Two-cell Trap.

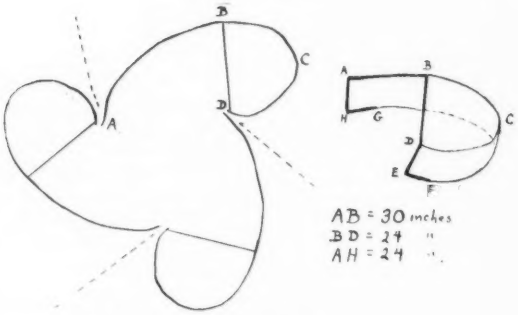


Diagram II.
Three-cell Trap.

C, A, and E. Each end should project about two inches beyond the scantling at A and E respectively. For the top, No. 19 gauge, 1 inch-mesh wire is recommended, for it is easier to work with and gives the trap more light. The diagram shows how the two sections fit together to form a two-funnel trap.

The Three-Cell Trap

This trap catches more birds than the two-cell but is harder and more expensive to make and set up. The pattern is that of the Three-

leaved Clover trap designed by F. C. Lincoln for Mourning Doves[2]. The side (ABCD) of a single cell is made of the same wire as that used in the two-cell, but the piece is only nine feet long. The cell is built on a frame of No. 9-gauge wire, shown by the heavy line (GHABDEF) in the side view (Diagram 2). The top is constructed with the wire recommended for the first trap but covers only the area bounded by BCDB. Each section has a wing (AB), so that when the three sections are in position there is a large unroofed area between the wings. This is covered, after everything else has been set up, with a piece of poultry wire. The relation of the leads to the trap is illustrated. At least two cells of each trap should have gathering-cages attached in the manner to be described later.

The Gathering-Cage

Except for the ramp, the entire gathering-cage (Diagram III) is made of ¾-inch No. 16-gauge hardware cloth. This is very stiff and eliminates the need for a frame. The sides (ADEH and BCFG) and the top (ABCD) are made out of one piece of wire 36 inches wide and 40 inches long. The back (CDEF) and the wings (AHN'N and BGM'M) of the V-shaped entrance are of the same wire. M and N are about 6 inches in from AB. The inner ends of the wings (MM' and NN') should be left flexible so that the width of the mouth may be adjusted. Two inches will be found most satisfactory.

The ramp (POO'P) is made of ⅜-inch hardware cloth, and its length is 20 inches. The top edge (OO') should be 6 inches high and 6 inches in front of the back. WW' is a vertical partition made of the same wire and is to prevent small birds from becoming wedged under the lower end of the ramp. The dotted lines (ST, ST, etc.) represent a most important feature of the cage. Taut strings or fine wires are strung vertically two inches apart between the upper edge of the ramp and the top of the cage. Both Least Sandpipers and Greater Yellow-legs walk readily up the incline and step between the wires down into the second compartment. To get back out a bird must fly, but with its wings spread it cannot get through the wires.

A door for removing the birds should be placed in the top near the back edge, so that one's hand may conveniently reach all the corners of the second compartment.

Attachment of Gathering-Cage

Attaching the gathering-cage to a section of a trap is not just a simple operation of cutting a hole in the side of the section and shoving on a cage. Diagram 4, representing the back side of a section, illustrates the best way of making the entrance. The wire is cut only along the dotted lines. The rectangular piece (MNOP) is *not completely* cut out, but is left attached to the side at E and F.

[2] *Bird Banding Notes* No. 13, November, 1924, p. 8.

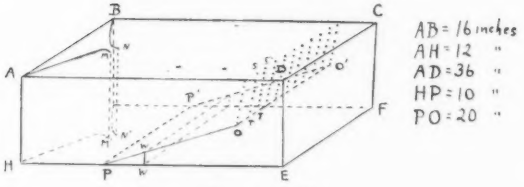


Diagram III.
Gathering Cage.

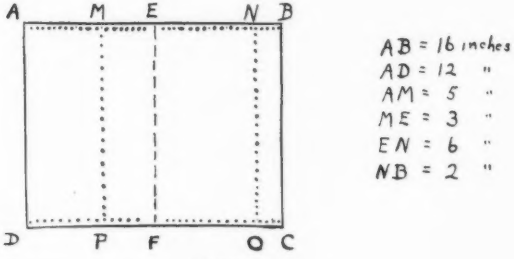


Diagram IV.
Attachment of Gathering Cage.

It is pivoted on the axis (EF) so that PO assumes the position of PO in Diagram 1 above. The guide thus formed has been found quite necessary, for without it the birds circulating about in the trap run past the entrance to the cage. The sections AMPD and NBCO are turned outwards on their respective axes MP and NO to form wings which fasten to the sides of the gathering-cage.

Material

Most of the wire and the hardware cloth used in the traps and the gathering-cages is specially chosen, and consequently the sizes of the gauge and mesh are not regularly stocked in hardware stores. However, the mail-order houses supply the wire promptly and cheaply.

Choice of Trapping Area

The choice of a suitable area determines more than any other factor the success obtained in trapping. Needless to say, it must be an area rich in natural food to which the birds readily flock. Trapping in tidal areas is not practical for many reasons. The two most important are: first, constant attention must be paid to the time and height of the tide to prevent drownings; and second, wherever the trap is set, it can function only for a brief interval at a particular stage of the tide.

At the Austin Station a pocket of the salt marsh was dammed off to create a two-acre pond. During most of the year this pond is kept flooded, so that there is an oozy, muddy bottom teeming with animal life. In shore-bird season the water-level is lowered until large areas of mud are exposed (see photograph, Fig. 5). At this stage it is difficult to prevent the pond from drying out, so now and then it has to be flooded to freshen up the muck.

In coastal regions non-tidal trapping areas have an obvious and important advantage. At low water great expanses of flats are exposed, but when the tide comes in, the shore-birds are forced back onto the mainland. There they congregate in secluded spots to wait until the tide drops and permits them to resume feeding. But with plenty of food available in the pond regardless of the tide, it naturally becomes a mecca for all the shore-birds in the region.

Setting Up the Traps

Little need be said on this subject, for the procedure is obvious. For leads, rolls of one-foot-high one-inch-mesh No. 20-gauge wire are fastened at six-foot intervals to stakes. Long, heavy wires with a hook on one end are useful for anchoring the sections and the ends of leads in place. The accompanying photograph shows a battery of traps in operation. Note how close together the traps are. Also the leads are arranged to enclose completely a great many small areas.

Results

The following table shows that the traps are capable of taking a wide variety of shore-birds in large numbers. The nature of the feeding area and its location are the selective factors. With the present set-up every species that may be reasonably expected has been trapped. Black-bellied and Golden Plover, Piping Plover, Turnstones, Sanderlings, Knots, and Curlew rarely, if ever, come into the pond. Ring-necked Plover, White-rumped Sandpipers, and Red-backed Sandpipers appear only in relatively small numbers.

Although twice as many and better traps were operated this past season (1934) than in 1933, far fewer birds were caught. This is explained by the fact that throughout September cold easterly winds kept the flight confined to the mainland. Except for the Least Sandpiper all the smaller species were taken in fewer numbers. The Leasts are not an exception, however, for only 61 out of the 357 were banded after September 1st.

Summary of Banding

Species	1930	1931	1932	1933	1934	*Total*
Semipalmated Plover	6	12	6	73	31	128
Killdeer	..	..	..	..	1	1
Black-bellied Plover	2	1	..	..	..	3
Ruddy Turnstone	..	..	..	1	..	1
Wilson's Snipe	..	..	5	..	5	10
Spotted Sandpiper	2	47	23	16	20	108

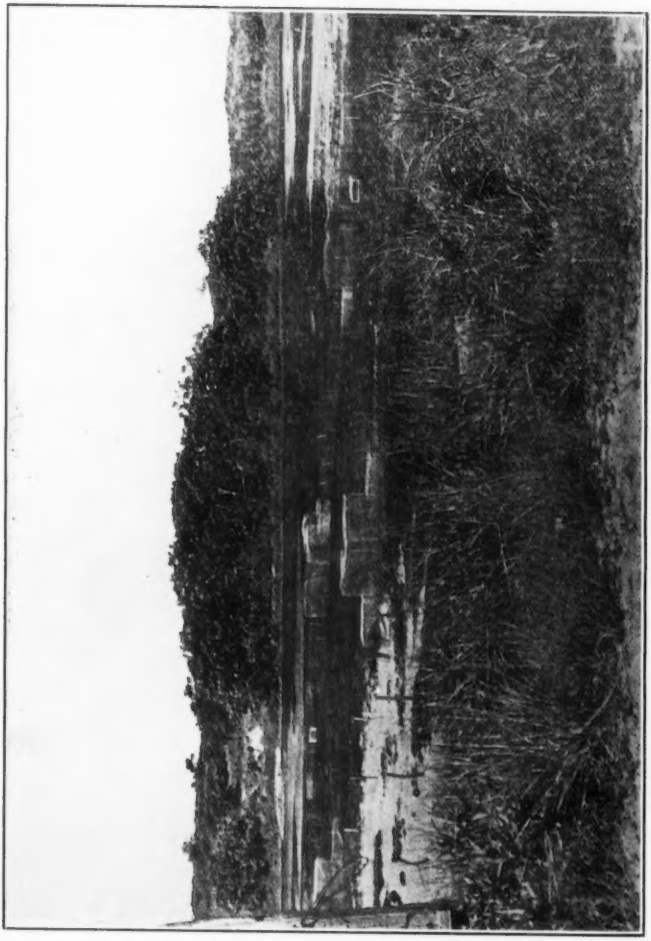


Figure V. Mud Flats Showing Traps in Position

Solitary Sandpiper	..	..	13	5	17	35
Greater Yellow-legs	..	..	2	8	41	51
Lesser Yellow-legs	..	..	6	42	44	92
Pectoral Sandpiper	1	1	3	26	26	57
White-rumped Sandpiper	11	1	4	25	3	44
Least Sandpiper	8	183	282	219	357	1,049
Red-backed Sandpiper	14	..	..	..	2	16
Dowitcher	..	..	..	8	27	35
Long-billed Dowitcher	..	..	..	..	1	1
Stilt Sandpiper	..	..	..	13	20	33
Semipalmated Sandpiper	5	199	68	1,895	653	2,820
Western Sandpiper	..	..	..	76	55	131
Wilson's Phalarope	..	..	..	1	2	3
Total	49	444	412	2,408	1,305	4,618

A list of other species taken in these two types of traps is appended merely as a matter of interest. However, it should be pointed out that the traps are fine for rails when set in the proper places.

Little Blue Heron
Green Heron
Black-crowned Night Heron
Yellow-crowned Night Heron
American Bittern
Black Duck
Green-winged Teal
King Rail
Virginia Rail
Mourning Dove
Barn Swallow
Myrtle Warbler
Pine Warbler
Western Palm Warbler
Northern Water-thrush
Red-winged Blackbird
Savannah Sparrow
Chipping Sparrow
Song Sparrow

Returns

Number	*Species*	*Banded*	*Returned*
C83434	Semipalmated Sandpiper	Aug. 23, 1930	Aug. 1, 1931
L1726	Semipalmated Sandpiper	Aug. 24, 1933	July 23, 1934
L1730	Semipalmated Sandpiper	Aug. 25, 1933	Aug. 15, 1934
L1765	Semipalmated Sandpiper	Aug. 25, 1933	July 21, 1934
F60297	Least Sandpiper	Aug. 27, 1931	Aug. 1, 1932
H03763	Least Sandpiper	Aug. 20, 1932	Aug. 2, 1934

Recoveries

L1986 Semipalmated Sandpiper banded Aug. 29, 1933, taken at Campano, Venezuela, Sept. 24, 1933.[3]

B319966 Wilson's Snipe banded Sept. 4, 1932, taken at Buck Island, Currituck County, N. C., Jan. 12, 1933.[4]

B234496 Lesser Yellow-legs, banded Aug. 14, 1933, taken by P. Jester, American Consul, Barbados, British West Indies, on October 29, 1934.

The returns and recoveries to date are few in relation to the numbers banded. But with more banders and with the possibility that the hunting-season on shore-birds may be opened, it is important to band as many of the larger species as possible. One factor, however, stands in the way of results—namely, that the bands corrode so badly that one year later it is almost impossible to read the numbers.

North Eastham, Cape Cod, Massachusetts.

[3] *Bird-Banding*, Vol. 5, No. 1, January, 1934, p. 47.
[4] *Bird-Banding*, Vol. 4, No. 3, July, 1933, p. 157.

TWO LABRADOR BANDING-RECORDS

By ALFRED O. GROSS

DURING the summer of 1934 the Bowdoin-MacMillan Arctic Expedition was made to the coast of Labrador under the leadership of Commander Donald B. MacMillan. The chief objective of the expedition was a study of the birds and plants of Labrador and a biological survey of the Button Islands.

In connection with the ornithological work we banded a number of birds, chiefly terns, gulls, and alcids, which comprise the great bulk of the individuals found among the many sea-bird colonies along the coast. It is yet too soon to receive any returns from our banding activities, but there are two records of banded birds found which are worthy of reporting at this time.

THE ARCTIC TERN (*Sterna paradisæa*)

We found the Arctic Tern all along the coast of Labrador from the Straits of Belle Isle to Cape Chidley, and a number were seen and specimens collected at Port Burwell (Killineck) on Ungava Bay and the Button Islands of the Northwest Territories. The most important breeding colonies were between 55° and 56° north latitude.

The Arctic Tern, because of its extraordinary migratory flight, yields especially interesting and spectacular banding results. A few records of recoveries available seem to indicate that the great mass of these birds go to South Africa and the Antarctic *via* Europe rather

Breeding Colony of Black-headed Gulls

than by the way of the Americas. For these reasons the Arctic Tern was given special attention by members of the expedition. At West Turnavik we banded about three hundred terns at several colonies, among which were the Red Islands, which were also visited by Dr. Oliver Luther Austin, Jr., during his expeditions to Labrador in 1926–28. On one of the Red Islands we found an Arctic Tern, the remains of which indicated that it had been killed but a relatively short time before our visit on August 16, 1934. On the tarsus was a band, number 548131. The United States Biological Survey has informed me that the band was placed on an immature bird by Dr. Austin on July 23, 1928.

This record adds another link in our information concerning the Arctic Tern. It indicates that this individual returned to the same breeding colony after its long migration to South Africa or possibly the Antarctic, a round trip of approximately twenty thousand miles. Probably the bird has bred on the Red Islands each summer. The band also fixes the age of the individual at six years.

THE BLACK-HEADED GULL (*Larus r. ridibundus*) OF EUROPE

When our expedition stopped at Makovik, Mr. Anton Anderson, a native fisherman, gave me a specimen of a Black-headed gull which he stated was taken at Stag Bay, Labrador, during September, 1933. The exact date was not recorded, hence only an approximation can be given.

This specimen establishes a new record for the coast of Labrador, and of added interest is an elongated aluminum tag attached to the femur above the tarsal joint, with the notation "Cogels Ossendrecht Holland 851". A letter to the above address has been answered with the interesting information that the gull was banded as an immature bird by Mr. Joseph Cogels, at Groote Meer near Ossendrecht on June 21, 1932. Ossendrecht is situated on the Escant River near the Belgium frontier, about seventy-two kilometers from the village of Bergen op Zoom in the province of North Brabant, southern Holland.

Mr. Cogels bands about six hundred gulls each season. He has received most of his recoveries from France, Spain, and Portugal, but a few have come from Morocco and Algeria in northern Africa. Stag Bay, Labrador, is over four thousand miles from Groote Meer, Holland, and, according to Mr. Cogels, specimen number 851 establishes for him a record of distance and uniqueness in recoveries of the Black-headed Gull.

There is a record of the Black-headed Gull for Newburyport, Massachusetts, indicating that occasionally these birds stray to northeastern North America.[1] How these birds make this erratic journey across the Atlantic is problematical. It is possible that they

[1]See *Auk*, xlvii, 1930, p. 243. This Labrador bird makes the second North American record for the species.—EDITORS.

are carried out of their usual range by storms. It must be remembered, however, that prevailing winds and storms are in an easterly direction, a fact which has been forcibly impressed upon transatlantic airplane flyers. These stragglers may have come by easy stages, stopping at the British Isles, Iceland, and Greenland, thence to the mainland of America, or possibly following the course taken by such other birds as the Arctic Tern.

The migration routes of the Black-headed Gull and the Arctic Tern coincide for a considerable distance through southwestern Europe and Africa. Hence it is reasonable to conceive that an occasional Black-headed Gull, if it becomes separated by storms or other causes, from individuals of its own kind, might follow the Arctic Terns on their journey to northeastern North America. This gull, number 851, was taken on the Labrador coast, where the terns are most abundant, and the fact that it was associated with terns when collected is significant and gives strength to the supposition.

Mr. Cogels has sent me a fine photograph of the Black-headed Gulls taken at a breeding colony near Groote Meer, the place where the bird was banded.

Bird-banding is a phase of ornithology which frequently becomes of international interest. It has been a thrill for me to receive an introduction to Mr. Cogels, a bird-bander and an ornithologist in Holland, through one of his banded gulls.

Bowdoin College, Brunswick, Maine.

THE DISTRIBUTION OF THE BIRD-BANDING STATIONS

By O. A. STEVENS

EVER since I have been connected with the work I have wished that we might have a complete list of station operators and a map which would show their locations. Recently it has seemed worth while to prepare a tabulation and map based upon the work of the fiscal year ending June 30, 1934, as summarized in "Bird Banding Notes" for September, 1934. This is admittedly quite incomplete, since it includes only about three hundred stations. In the main, however, it probably gives a fair idea of the distribution. It is not a full review of the year's work in that many reports probably were received soon after July 1st. In my own region I know of three stations within a one hundred-mile radius which are missing. Since other reports were received shortly after July 1, 1933, this feature should be balanced and may be disregarded.

The number of stations and the total number of birds banded as given in the report are as follows:

	64 stations, banding over 1,000	159,438
	13 stations, banding 800 to 1,000	11,700
	19 stations, banding 500 to 800	12,350
	55 stations, banding 300 to 500	22,000
	46 stations, banding 200 to 300	11,500
	100 stations, banding 100 to 200	15,000
Total	297 stations, banding over 100	231,988
	1,577 stations, banding less than 100	131,917
	Total	363,905

It will be noted that the stations banding less than one hundred birds each have contributed a very substantial portion of the total number for the year (36 per cent).

Listing the stations by States and Provinces, we find thirteen reaching totals of five thousand or more. These are listed below with their respective totals, and the others are arranged in three groups.

Massachusetts	27,515	British Columbia	9,940
Illinois	23,345	South Dakota	9,239
Ohio	22,117	Louisiana	8,135
Michigan	19,677	Wisconsin	7,968
California	18,191	Pennsylvania	6,248
New York	14,841	Oregon	5,662
North Dakota	10,926		

1000–5000	Florida, Indiana, Kansas, Maryland, Minnesota, Mississippi, Missouri, Montana, New Hampshire, New Jersey, South Carolina, Tennessee, Utah, Alberta, Manitoba, Nova Scotia, Ontario.
100–1000	Arizona, Arkansas, Colorado, Connecticut, Delaware, District of Columbia, Iowa, Maine, North Carolina, New Mexico, Oklahoma, Rhode Island, Texas, Virginia, West Virginia, Quebec, Saskatchewan.
None over 100	Alabama, Georgia, Idaho, Kentucky, Nebraska, Nevada, Vermont, Washington, Wyoming, New Brunswick, Prince Edward Island, Yukon, Northwest Territory.

The map shows a scarcity of stations in the South, in the Middle West, and in the mountainous regions; a strong concentration in a few areas. The former probably can be accounted for on a basis of human population. The latter is due in part to the same thing, but also to the infectious enthusiasm which plays a large part in bird-banding.

One feature which is shown prominently on the map is the scarcity of stations in certain States. Thus Iowa and Nebraska are poorly represented, where the opposite might have been expected. Vermont is not represented, although New Hampshire totals over three thousand. Washington is not represented, although Oregon and British Columbia both are above five thousand.

These figures should be sufficient cause for some serious consideration of the further development of the work. In the same report the Survey expresses the hope that "it will be possible to have 5,000 active banding stations in well organized chains, not only in the United States and Canada, but also in the Latin American

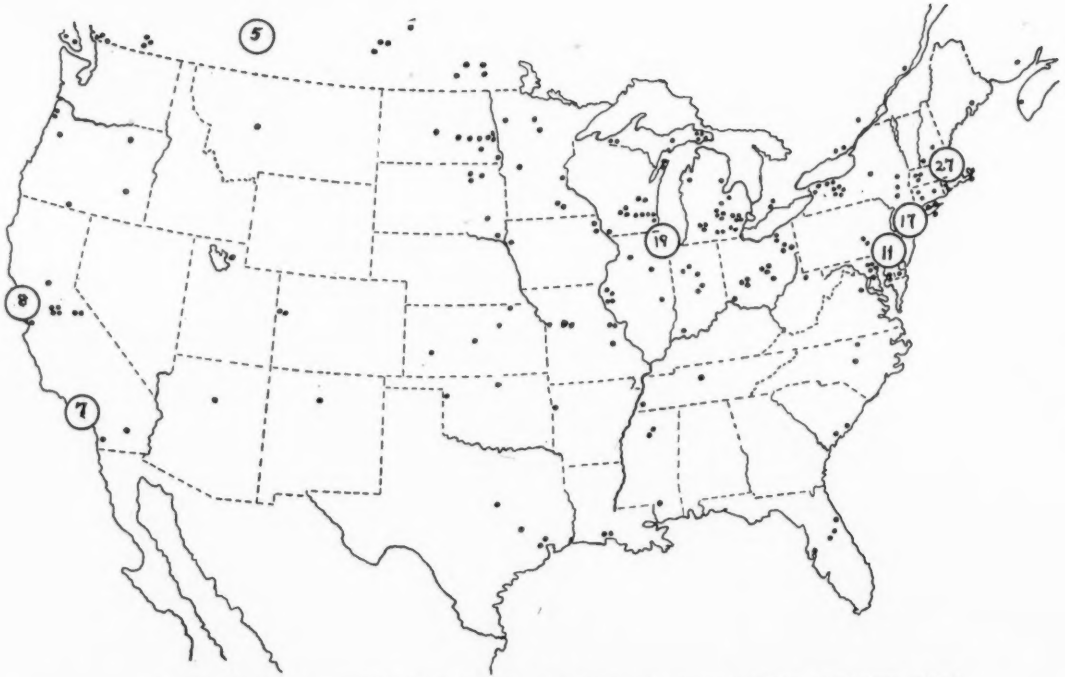


Figure I. Outline map of the United States showing approximate location of stations which reported the banding of one hundred or more birds for the year ending June 30, 1934. Numerals in the circles represent that number of stations too close together to show well on the map.

countries." This would mean, let us say, three thousand in the United States, or ten times as many as are shown on the present map. The value and need of closer coöperation of station operators is being felt more and more. The advantages coming from the aid of one or more near-by stations, are being repeatedly demonstrated. At the present time special attention should be given to the development of stations in locations where they are most needed or most likely to yield results of value. I have previously called attention (*Inland Bird Banding News*, 3 (4): 5. 1931) to the importance of the lower Mississippi Valley area. There are many other regions where additional stations might be established to special advantage. More detailed study of the work of various stations would probably aid in determining the most suitable locations for new ones.

I doubt whether there is any subject in which the scientific and popular interests are so inseparable as in ornithology. The specialist, to be sure, may bury himself in his investigations and disregard the popular side of the story. The layman, on the other hand, has continual opportunities to make additions to our scientific knowledge. So often is he unconscious of these opportunities that he cannot develop them, and the observations made are either not recorded or become lost in the endless amount of similar fragments.

It might be said that bird-banders are born, not made. Certainly there are many individuals who possess the natural ability to conceive problems and to carry out the various details which are required of a successful station. There are perhaps few who have the indefatigable industry which promotes a large station and carries it on for a number of years. It is equally true that there are many who have the ability to carry on, and need only to have their attention directed to the work. Here is needed the enthusiasm derived from that personal contact which has been responsible for the development of many of the successful stations.

A number of people have demonstrated what can be accomplished by intensive study of a particular species. Probably there are not a large number of stations where extensive studies can be carried on, but even on a small scale it will be well to consider what can be done in this direction. Whether or not other species should be disregarded when specializing upon a certain one, is a matter to consider. To a certain extent the trap requirements of many species tend to exclude various other species. Ordinarily we should say that all birds taken should be banded, but it is possible that some better arrangements can be made. A careful study of the work of various stations, especially of closely associated ones, may suggest lines of procedure.

THE EIGHTH INTERNATIONAL ORNITHOLOGICAL CONGRESS

By MARGARET MORSE NICE

FIFTY years ago the First International Ornithological Congress met in Vienna; on July 2, 1934, the eighth of these meetings convened in Oxford. Some three hundred and fifty ornithologists from twenty-five countries gathered for the purpose of telling their discoveries, sharing their experiences, becoming friends, and protecting the birds.

The mornings were devoted to papers which were given in English, German, French, and Italian. Section I was concerned with Taxonomy, Zoö-Geography, and Bird-Behaviour; Section II with Anatomy and Physiology; Section III with Migration and Ecology; and Section IV with Protection and Aviculture.

Banding was much to the fore in Section III, both in the matter of homing experiments and migration. A notable report was given by Dr. W. Rüppell on Starlings, 353 of which had been caught at their nesting-boxes and sent to Berlin from all over Germany, 106 being subsequently captured at or near their homes. Mr. W. B. Alexander, of Oxford, gave a history of homing experiments, concluding with recent studies on House Sparrows and Greenfinches in winter, while Dr. R. Drost told of similar researches with migrating birds caught at Heligoland. Long papers illustrated with many maps on migration as shown by recoveries of ringed birds were given by Dr. E. Lönnberg for Sweden, Dr. E. Schüz for Rossitten, Dr. Drost for Heligoland, and Mr. H. F. Witherby for England.

The subject of censuses was discussed by Messers A. D. Middleton, Julian Huxley, and E. M. Nicholson. The latter reported on the comprehensive censuses of Common Herons taken in England in 1928 and the sample censuses since then, suggesting that such counts of *Ardea cinerea* would be an excellent project for international study. The consensus of opinion, however, seemed to be that any publicity given to the numbers of Herons might result in their increased persecution by fishermen.

There were less than half a dozen papers on life-history subjects: two on the breeding habits of a shore-bird and a harrier, my own on "Territory and Mating in the Song Sparrow," a lecture by Dr. Schüz on the ecology of the White Stork, and an important discussion by Dr. K. Lorenz on "Comparative Sociology of Colony-Breeding Birds."

One afternoon there were moving pictures: Chance's film "The Cuckoo's Secret" showing the bird laying in a Meadow Pipit's nest; another film showing the ejection of a baby Reed Warbler by a nestling Cuckoo and later the little foster parents alighting on the head of the great changeling to feed it. There were fine pictures of

the Golden Eagle in Scotland and marvellous ones of the Gannets at Grassholm, exhibited by Professor Huxley. Finally the home life of the Osprey was shown to us by Herr Horst Siewert with superb lantern-slides.

Two afternoons were spent on excursions. On Tuesday some of the members visited Lord Lilford's waterfowl collection, while the rest of us went to Foxwarren Park, where we saw many rare birds in Mr. A. Ezra's aviaries, including Pink-headed Geese and Sun Bitterns, and where kangaroos and springbok dashed over the hillside and a Sarus Crane came to drive us away from the vicinity of his nest. Another day we took char-à-bancs to Whipsnade, the zoo where the animals live as nearly as possible under natural conditions; here we were given a delicious tea by the Zoölogical Society.

The Congress was distinguished by the number and brilliancy of the social occasions. The first reception was given in the Town Hall by the Mayor of Oxford,—a woman of distinguished presence who provided us with a bountiful tea and showed us the treasures of the city—its gold and silver plate and ancient charters. That same evening the Vice-Chancellor of the University received us at the Ashmolean Museum, where, besides the art treasures, there was a special exhibit of contemporary British ornithological art with some notable pictures. For this occasion we were requested to wear "academical and evening dress," and many were gorgeous in the brilliant gowns pertaining to their colleges.

On Wednesday evening the President and Council of the Royal Society for the Protection of Birds invited us to a reception in Exeter College, where the gardens were flood-lit and where in the Hall ornithologists waltzed to tunes played by the band of His Majesty's Coldstream Guards.

The dinner given by the English members of the Congress to the "overseas guests" was a very splendid affair. In Christ Church Hall —one of the most beautiful halls in England—with Queen Elizabeth and Henry the VIII looking down at us, we sat on benches at seven long tables, the officers and chief dignitaries, in robes and with decorations, being seated at the Top Table. The "toastmaster"—a special official—gained our attention by announcing in a stentorian voice, "My lords, ladies, and gentlemen, pray silence for your President, Professor Dr. E. Stresemann," and so on for each one of the speakers. Afterwards it was a special pleasure to me to meet Mr. H. Eliot Howard and to discuss with him the burning subject of territory.

The Long Excursion proved a fitting climax to the Congress. One hundred and fifty of us traveled all day in buses to the quaint little town of Tenby on the coast of Pembrokeshire in Wales. The next day as guests of the British Admiralty we were carried by two destroyers, the *Windsor* and the *Wolfhound*, over the smoothest of seas to the bird islands Skokholm, Skomer, and Grassholm. On the first of these the owner, Mr. R. M. Lockley, had birds and their

nests most carefully labelled for us—Puffins, Stormy Petrels, Manx Shearwaters, Oystercatchers, Greater and Lesser Black-backed Gulls, Razorbills, etc. At Skomer there were unbelievable numbers of the absurd little Puffins, the ground was honeycombed with Shearwater nests in rabbit burrows, while the greatest sight of all was an immense cliff crowded with thousands of Guillemots (Murres) on their nests with here and there a snow-white Kittiwake.

Then we sailed to Grassholm, and when we drew near, it seemed as if the island were covered with new fallen snow. It was a marvelous and indescribable sight—acres and acres of the great white Gannets on their nests!

The trip home in the evening was very beautiful with the lovely gulls following the ships. And then came the Manx Shearwaters in a great stream hurrying home to Skomer—a thrilling sight. Before reaching the island, however, they thought better of their haste and settled on the water waiting for darkness to fall to protect them on their return from the Great Black-backed Gulls.

Monday we travelled back again to Oxford by a different route, being entertained at tea at Stanway House by the Earl and Countess of Wemyss and the Hon. Guy Charteris, who is an authority on Cuckoos. A pleasant feature of the long bus-rides was the chance to visit with different ornithologists. Tuesday there was a final reception at the Natural History Museum at London, where rare books were exhibited, and also examples of all the new bird species that have been discovered since the last Congress.

The Eighth International Ornithological Congress was a very great occasion for those fortunate enough to participate. Many elements contributed to its success: Oxford with a cloudless sky and all the glory of the ancient, beautiful colleges; the unselfish labors of the officers and members of committees—the Secretary, Rev. F. C. R. Jourdain, Mr. B. W. Tucker, Mr. H. F. Witherby, and many others; the generous hospitality of our many kind hosts; the conversations with ornithologists from many lands; the charm of the President, Dr. Erwin Stresemann, who with his delightful humor and gift for friendship always said the happy, gracious thing; the stateliness and splendor of the entertainments; and finally the never-to-be-forgotten day with the sea-birds.

Amherst, Massachusetts.

GENERAL NOTES

A Plea for Coöperative Ornithology.—During the past three years I have banded 257 fledgling Tree Swallows (*Iridoprocne bicolor*) at Princeton, Massachusetts. Of this number, 148 were banded in 1934 and hence cannot be taken as returns until 1935. Of the 109 banded in 1932 and 1933 only 6, or 5.5 per cent, have been taken as returns at the original colony or in the town of Princeton.

If bird-banders in New England and especially in Massachusetts would make an effort to trap adult Tree Swallows, some valuable information might be obtained on the dispersal of these Princeton fledglings.

Tree Swallows would make an excellent species on which bird-banders might concentrate, to obtain information on the dispersal of fledglings, because of the ease with which both the male and female can be trapped in a nest-box.—L. B. Chapman, Newton Highlands, Massachusetts.

A New Method of Banding Sea Ducks.—During my studies of the birds in the St. Mary Islands Sanctuary on the North Shore of the Gulf of St. Lawrence, in the summer of 1934, eighteen American Eider ducklings (*Somateria mollissima dresseri*) were banded. These youngsters were picked up on the nesting islands and banded when a few hours old. The banding was done by placing a small No. 2 band around the hind toe, passing it through the lobe of that toe. A small slit was made in the lobe with a pen-knife through which the band could be easily passed. The operation appeared to be painless. Bleeding, when it occurred, was almost imperceptible. The No. 2 band was found to be large enough to accommodate the toe of the adult and not appreciably to hinder the movements of the baby duck in the water.

I believe that this method of banding the downy young of birds with lobed toes is new and that it is worthy of further experimentation. Certainly it is almost impossible to secure any appreciable number of adult Eiders for banding without interfering seriously with their nesting activities. It is only for a short time during the nesting-season that they are found in any concentration which would offer opportunity for trapping. As yet, I believe, less than a dozen adult birds have been banded, owing to the difficulty of securing them without disturbing the nest. Of course the newly hatched ducklings cannot be banded by placing the large bands used on adults on the small tarsi, and after they leave the island where they hatch (usually the first or the second day) it has been found impossible to capture them again.

It seems possible that ultimately another advantage may come through banding newly hatched young. If we can sometime determine the ratio of returns from the adults banded and use this in computing the status of the species, it might be possible to compute the ratio of returns from the newly hatched young which were banded and thus secure data which would be of considerable importance. In the case of the American Eider in the region which I have visited, the Great Black-backed Gull is a very serious enemy. What percentage of the great loss of young ducks should be charged to this predator is a disputable matter. If control methods are instituted on the Gull in behalf of the Eider any marked increase in the crop of ducks produced could be measured, to some extent, through extensive banding of ducklings.—R. A. Johnson, State Normal School, Oneonta, New York.

A Singing Female Song Sparrow.—During the spring of 1934 I had at my home in Worcester, Massachusetts, a singing female Song Sparrow, C189638.

When the bird first arrived early in April, it sang a great deal, and I followed it about for several days, for it was hard to believe that a Song Sparrow could be the author of that peculiar song.

I captured and banded the bird on April 10th, placing a black band on the left leg. Wing and tail measurements of 63.50 and 65.25 mm., respectively, and weight of 20.40 grams indicated that this bird was a female. I later checked up and found that the peculiar song and black band belonged to the same bird. The only other

Song Sparrow in my garden at the time was a male B176573, a return-2, which arrived about March 20th, with which I believe the singing female was mated.

The early morning seemed to be the preferred time for singing, for although in April the female's song was heard at all hours of the day, later in the season it was heard only before 8 A.M. She sang at increasing intervals until about June 17th. As I was away from home from June 17th to September 3d, I have no later records.

The song was high-pitched, neither weak nor harsh, but a loud, clear series of whistled notes of varying length (usually of seven notes) seemingly all on the same key. It resembled more the song of the White-throated Sparrow than that of any other bird. The first note was longest, then came three short notes, followed by three notes, each nearly as long as the first, thus: *we-e-e, we, we, we, wee, wee, wee.* There seemed to be four beats to the first note, one beat for each of the following three notes and three beats for each of the last three notes. The time of delivering each note and the space of time between songs were similar to those of the male.

One main song of the male sounds (to my ears) thus: *zip, zip, zip, sir we-e-e, sir, sir we, sir, witz, witz,* with many variations. The females' song included only the fifth note of this male's song and the key seemed to be D of the last, highest octave on the piano. The female Song Sparrow is invariably seen close to the ground, but this female always sang from an elevation of from fifteen to twenty feet, choosing usually a branch of a poplar or the top of a peach tree near by.

Mrs. M. M. Nice in "Zur Naturgeschicte des Singammers," *Jour. f. Ornithologie*, 51, pp. 552–595, 1933; 52, pp. 1–96, 1934, disagrees with E. M. Nicholson in his book on how birds live (52, p. 51–52), who makes a distinction between the "true song" that is a "territorial song" and "invariably uttered at the top of the voice" and the "sub-song" which is "low and inward." He states that "with the possible exception of robins (*Erithacus rubecula*), where the hens keep a separate territory of their own in winter, all records of singing females appear to refer to sub-song, and not true song." Mrs. Nice feels that the female's song is a true song resembling the territory song of the male with all the music omitted, and although it may be a matter of self-assertion, in most cases it appears to be a kind of vestigial phenomenon, eliciting no response from any other Song Sparrow. I heartily agree with Mrs. Nice in this matter, for the song of my female was loud and was delivered in much the same way as the male's song. I could find no reason for her having a territorial song, as the male sang normally and no other Song Sparrows were seen in the vicinity. There seems to be no accounting for her unusual behavior.

Mrs. Nice says that Saunders suggests that singing females may be unusual individuals, that possess some trace of masculine characteristics. She states that one of her singing females had had a peculiar history of wandering from one mate to another in February and later seemed rather uninterested in her nesting, and that another singing female appeared unusually aggressive. It is a regrettable fact that I was unable to obtain any nesting data on my singing female.—Mrs. Kenneth B. Wetherbee.

Notes on the 1934 Tree Swallow Breeding-Season.—This season with the Tree Swallow (*Iridoprocne bicolor*) has given interesting notes on the relations existant between breeding pairs, and the correlative relations to late-migrating brown, first-year-breeding females. Coincidentally, it has shown a conclusive explanation for the changing of mates and disappearances of breeding birds which occur. It has shown, too, a constancy in the incubation period; and gives probable new data on unusual nestings. The 1934 activities, in particular, with observations on a return male, give an explanation, in part, of the 1933 tragedies recorded by me in, *Bird-Banding*, 1934, p. 134.

Of five nesting return birds three were trapped: F60913 (♂) nested at Boxes 5 and 1 with his first two mates, and at Box 1 with his third, brown, mate. His mate of 1933, H49344, figuring in the 1933 tragedies, in 1934 nested in Box 10, one hundred and ten yards from Box 5, where she nested formerly. A female that nested at Substation C in 1932, F60921, this season selected station Box 13, a mile from the former site. Two females, one at Box 3 and the first seasonal mate to F60913 at Box 1, were not trapped, and their return status is unknown.

Regarding F60913 and his three mates, at two nest-boxes but twenty yards apart, at no time was there disputing between the first two mates. He spent his time about equally between the two. He showed his first noticeable pugnacity on April 17th, when an odd male flushed Box-5 female, L34877, from the ground while she was gathering hay, and as she alighted in an apple tree, tried to mate with her, F60913 giving instant pursuit. On the other hand, when, the following day I lowered Box 1 for inspection, the female repeatedly dove at me, but the male showed no such protective display. The Box-5 brood died from chilling within a few nights after the female ceased night-brooding, when the temperature dropped to 31° on June 8th. The next few days L34877 spent in examining Box 1, from which the other female had been driven away by two brown females, one of which deposited an infertile egg among the well-incubated clutch, the box not having been cleaned out since her desertion on May 23d. When it was cleaned out, and previous to her leave-taking on June 14th, L34877 had some days of disagreement with her successor, later banded 34–24376, when she had settled to nesting in Box 1. They reared one young, which left the nest July 24th.

The first Tree Swallow of the season arrived at the station on April 3d, when the migration of the species was nearly over. About May 1st brown females commenced to appear, and they were common throughout their migration, which lasted to June 16th. It was their late appearances and their actions about occupied boxes which was directly responsible for the rather unsuccessful breeding-season and constant disputing over nests. Since these unmated birds arrive to such an extent after nesting by older pairs is well under way, they are susceptible to mating, and they do mate with paired males, who often desert their former mates for the new-comers. This happened at Boxes 3 and 8 before egg-laying by the original female, and not only she but the male and his new, brown mate also disappeared from the station.

An exceedingly tame half-brown female, L34879, vainly tried for four hours to enter the nozzle of a gas-pump on May 5th. Box 12 was then placed on a near-by pole, and it was immediately taken and nest-building was begun the following morning. This female used several white inner-gum-wrapping papers in lining her nest, probably because white hen feathers were then at a premium.

The female, L34878, at Substation B Box 57, laid three eggs within a twenty-four-hour period. In late afternoon of May 19th there were no eggs in the nest, but three eggs had been laid by noon of the 20th. Two additional eggs laid in the two successive days completed the clutch. It is significant that two eggs of this clutch proved to be infertile.

Another interesting item concerns the male swallow at Box 2. On May 1st, having watched some sparrows feeding on oatmeal at a large flat trap, this swallow flew down to the ground directly in front of the door and proceeded to eat rolled oats scattered there!

Twenty nestings came under observation. Of this number but seven were wholly successful. Of ninety-one eggs laid, sixty were hatched and thirty-one birds lived to leave the nest. All nesting females, save the one from Box 8, were banded. No attempt was made to band the males. Two original mated pairs attempted second broods, at Boxes 7 and 31, the first nestings having been broken up by troublesome brown females, and this was the case with their second attempts. At eight nests eggs were not hatched, at six nests the incubation period was not determined, but six clutches are known to have had an eighteen-day period; while of one clutch of five eggs in Box 10, three eggs hatched in eighteen days and the other two in twenty days. Before leaving Substation B, L34883 female from Boxes 60 and 31, attempted to nest for a third time after twice having lost her mate to a brown female. She disappeared about June 6th, mateless.

Cats, climbing the slender ten-foot poles, were responsible for the destruction of five nests, Boxes 2, 7, 10, 11, and 13, the last at the time containing eggs; and not only pulled out the young birds but much of the nests and especially the feather linings. Brown females were responsible for causing breeding females to leave six nests, Boxes 1 (first nesting), 3, 8, 31, 60, and 71. Brown females nested at Boxes 1 (second nesting), 12, 27, and 51 and Substation C. At Boxes 27 and 51 the males were known to desert their first mates while incubating eggs,

and, although the nests were broken up by the brown females and the first mates stayed about for a few days afterward, these males mated to the brown birds and settled close to the former nests. Two brown females laid their first eggs on the bare floor of boxes, with just a nest-edging of hay.—Lewis O. Shelley, East Westmoreland, New Hampshire.

Returning Chickadee Mates.—The warm weather has delayed the return of Chickadees this fall, but one pair, which reappeared at my station on October 26th, is of special interest. This pair, F23149 (male, banded January 17, 1932), and F31792 (female, banded October 24, 1932), part of whose history was given in a note in *Bird-Banding*, January, 1934, mated in the spring of 1933, having previously been together through the winter. That year their nest was not found, but as they were together on a feeding-shelf on May 10th, when the female begged, with fluttering wings, to be fed, and lunched there again in each other's company on July 9th, there was no doubt that they were a mated pair. Throughout last winter they were much together and this spring remated, raising two broods in the same hole in a birch stump, about three hundred and fifty yards south of my station.

Including their return together on October 26th, the male has been seen on nine of his visits for peanuts, on seven of which, and possibly also on the other two, he was accompanied by his mate.

The tendency of mates to keep together at other than the nesting-season was also noticed last fall. This might be supposed to result from traveling in the same flock, but the above pair is at present alone, except for one new Chickadee that attached itself to them early in the fall.

A second (probable) pair, L18935 (banded October 24, 1933) and H71312 (banded December 9, 1932), are also returns this fall. H71312 has been with its mate on eleven and possibly twelve visits out of fourteen, but L18935 has made seven visits alone (at least the other of the pair was not seen) or with other Chickadees, several of which are now flocking with these two.—Dorothy A. Baldwin, Hardwick, Massachusetts.

A Twelve-Year-Old Blue Jay Recaptured.—On the 17th of November, 1933, a Blue Jay (*Cyanocitta c. cristata*) bearing band number 9612, was taken in a flat trap. This bird had been banded on January 2, 1922, by Mr. Aldred S. Warthin, Jr., at a station located about three hundred yards from the site of recapture. While the numbers were entirely legible, the band had worn thin and was therefore replaced by C333993. The bird has not been retaken since.

This indicates that Blue Jay 9612 was at least twelve and a half years old when it was retaken, more than two years older than the Wren-tit recently reported by E. L. Sumner, Sr., (*Condor*, 36, 1934, p. 170) as the oldest recorded wild passerine bird.—Thomas H. Weller, Ann Arbor, Michigan.

An Age Record of the Common Tern.—The following recovery is of interest because of the length of life of a Common Tern (*Sterna h. hirundo*) that carried band number 674003 from July 1, 1928, until it was reported killed on September 7, 1934.

The bird was banded as a juvenile on Tern Island, Chatham, Massachusetts, and was killed on the west coast of Puerto Rico at Cabo Rajo.—Charles B. Floyd, Auburndale, Massachusetts.

A Downy Woodpecker with a Broken Bill.—The inbreeding male Northern Downy Woodpecker (*Dryobates pubescens medianus*) banded A260655,[1] a permanent resident bird at our yard, coming to the food daily or nearly so over a

[1] See *Bird-Banding*, Vol. III, pp. 69, 70, 1932.

period of several years, becoming four years old the summer of 1934, suffered an accident that will make him hereafter a positive sight repeat. About mid-July he was first noticed acting strangely when feeding on doughnut at the piazza post. It was then seen that he had very recently suffered an accident to the upper mandible, which from the base stuck up at an abrupt angle and was thus bent back from the lower bill. He had at that time adapted himself to meet this odd deformity.

The changes in the bill until it was healed and as perfect as it ever would be again, were watched; these covered a period of some ten weeks. At first the damaged mandible was of normal length, but gradually it became worn down and off until once more flat with the lower, while only a little more than half its length, and only the central bridge of the bill was left and that much shortened and narrowed. It resembles somewhat the bill of a Black Skimmer (*Rynchops nigra*).

For weeks he could feed on nothing but fresh doughnut, supplied each morning. He would cling to this with his breast feathers pressed against the food, neck hunched down until his bill in use worked in conjunction with the breast feathers, which made a shelf, or pocket, to catch crumbs. Most of the food was taken by pecking upward and catching it as loosened, letting it, literally, roll down his throat; he sometimes scooped up crumbs caught on his breast, doing this with a quick upward flirt of the head. The upper bill at all times was useless, and, as is shown by its constant wearing away, was often a handicap and in the way; this wearing down probably happened when he gleaned natural food in the woods, as he must have done to some extent. Boring is greatly impaired if not forever impossible. When he could manage the suet after some eight weeks, pecking it off in pieces with an upward lift of the lower bill, he discarded the doughnut as food.

Perhaps because of the bill handicap and subsequent lack of stamina from lack of necessary food elements, moult was retarded. Moult did not begin to show until the other Downies, including his four-year mate and one of his eldest daughters, had completed their moult; even after the young-of-the-year had acquired their bright, clean new plumage. During the moult he was seen to thrust his lower bill among his body feathers and, without pecking but slowly scratching the bill along, endeavor to rid his body of loose feathers and feather-sheath scales. It was a long, slow process, yet his new plumage had a sleekness comparable to that of normal birds.

He is the only Downy I have seen to alight to drink beside the brook. Alighting on a convenient perch close to the surface, bending over and suddenly ducking his bill into the water and then raising it abruptly, he drinks very much as he feeds.—Lewis O. Shelley, East Westmoreland, N. H.

RECENT LITERATURE

(Reviews by Margaret M. Nice)

The articles reviewed have been selected and arranged under subjects of importance to students of the living bird and also for the purpose of suggesting problems or aspects of problems to those banders who wish to make the most of their unique opportunities.

Headings in quotation-marks are the exact titles of books or articles or literal translations of such titles. Other headings refer to general subjects or are abbreviated from titles in foreign languages. References to periodicals are given in italics. Footnote references appear at the ends of topics instead of at the bottom of pages.

BIRD-BANDING

Banding in North America.[1]—Since 1920, 1,745,514 birds have been banded in the United States and Canada, and 100,772 "returns" reported—a "return" meaning a recovery of a bird away from the station*, or at the same station if absent for three months or more, or at any time anywhere, if found dead. There are 1874 coöperators. During the past year 363,905 birds were banded.

Banding in Belgium[2].—An interesting résumé of facts gleaned by ringing. M. Dupond says that returns with most small birds amount to only 2 to 3 per cent of those ringed, but with game-birds reach 20 to 30 per cent, and run highest of all with birds of prey. Again and again he gives instances of returns of nestlings to the place of birth, stating that "this rule of return to the birthplace is a principle that holds true for all birds" (p. 9).

Banding in England.—Three papers in *British Birds* discuss recent returns and recoveries. Considerable data is given in the first[3] on the return of nestlings to the place of birth. The other articles[4], [5], illustrated by numerous maps, are full of information on movements of ringed birds to and from England. Among many interesting items there are nine recoveries listed of Sandwich Terns (*Sterna s. sandvicensis*) from West Africa.

[1] *Bird Banding Notes.* 1934, 2, No. 11, U. S. Biol. Surv., Washington, D. C.

[2] Dupond, Ch. 1934. Quatre Années de Baguage d'Oiseaux (1930–1933). *Ornithologie*, Nos. 77–82, 1–15.

[3] Recovery of Marked Birds. 1934. *British Birds*, 28, 67–72.

[4] Witherby, H. F. and E. P. Leach. 1934. Movements of Ringed Birds from Abroad to the British Isles and from the British Isles Abroad. Addenda III. *British Birds*, 28, 106–112.

[5] *Ibid.* 1934. *Ibid. British Birds*, 28, 133–141.

HOMING STUDIES

Homing Experiments with Swallows.—In Poland 29 Swallows (*Hirundo rustica*) were taken from 6 to 72 miles from home; all but two returned.[6] Particularly striking were the experiments reported by W. Rüppell,[7] where 21 nesting Swallows and 3 Martins (*Delichon urbica*) were taken by night train from Berlin and released the following morning (July 28th) at stations from 236 to 330 miles to the west, the last two stations being in Holland. Birds returned from all the localities but the last, the greatest distance being 306 miles. Four reached home June 29th, seven June 30th, and one July 1st.

* In a letter dated July 11, 1933, Mr. F. C. Lincoln writes: "We [the Biological Survey] were [are] forced to make an arbitrary decision in the matter of station returns and have decided that five miles should be the minimum," this in order that the Survey may decide whether or not such captures (see below) shall be classified as "returns" or "repeats." This matter came up for a decision in the case of birds banded at J. V. Miller's and C. L. Whittle's stations in Peterboro, New Hampshire, which are only two and one half miles apart. These banders were reporting captures of each other's birds to the Survey, even when the captures were made a day or two apart, as returns. However, if the elapsed time between takes is over three months, they are still classified as genuine returns as the Survey uses the term.—Editor.

"Homing Pigeons."[8]—An interesting paper in which Prince Chigi emphasizes the fact that the ancestor of the Homing Pigeon—the Rock Dove (*Columba livia*), unlike all other European Pigeons, is non-migratory. This species makes long flights in flocks to feeding-grounds; it has a strong instinct to return to its home, but its powers of orientation are poor. If a bird loses its way, it acts "idiotically," its normal reactions of fear and hunger being inhibited. When pigeons are released over courses of one hundred and twenty miles, the loss of birds is only 5 per cent, but on one hundred and eighty mile courses it rises to 20 per cent and on longer distances to 50 and even 99 per cent.

[6] Wodzicki, K. and R. J. Wojtusiak. Untersuchungen über die Orientation und Geschwindigkeit des Fluges bei Vögeln. I. Experimente an Schwalben (*Hirundo rustica* Linn). *Vorläufige Mitteilung*; *Acta Ornithologica Musei Zoologici Polonici* 1, 8, 253–274.

[7] Versuche zur Ortstreue und Fernorientierung der Vögel III. Heimfinde-Versuche mit Rauchschwalben (*Hirundo rustica*) und Mehlschwalben (*Delichon urbica*), von H. Warnat. 1934. *Vogelzug*, 5, 161–166.

[8] Chigi, F. 1934. Colombi Viaggiatori. *Rassegna Faunistica*, 1, No. 2, 4–32.

MIGRATION STUDIES

"Migration and Solar Cycles."—L. W. Wing, 1934. *The Auk*, 51, 302–304.—The author believes that "the variations in the times of arrivals and departures are ultimately traceable to the sun," and gives charts showing the correlation between the migration of two species and sun-spots. It seems to the reviewer that both this and a second paper[9] are too much in the nature of preliminary reports; that both theory and facts should be stated far more fully and the literature of the subject presented.

Schildmacher's Experiments Again.—These experiments where the female sex hormone was injected into migrating Redstarts (see *Bird-Banding*, 1934, p. 137) are criticized by H. Desselberger and G. Steinbacher,[10] who find them contradictory. In answer to this paper, H. Schildmacher[11] explains the significance of his results more fully.

Further experiments with the female sex hormone were undertaken at Breslau following Schildmacher's lead.[12] A number of male Passerines were injected during the winter with folliculin, and two of them showed migration restlessness. A male Lesser White-throat (*Sylvia c. curruca*), captured at the end of May and injected for twelve days, also began to exhibit migration restlessness. The authors explain their findings thus: all the males presumably had enlarged gonads (the first two because of being kept in a room lighted until late in the evening) and a reduction of the gonads was effected "through the antimasculine effect of the female sex hormone and thereby the migration drive released."

[9] Cyles of Migration. 1934. *Wilson Bulletin*, 46, 150–156.

[10] *Vogelzug*, 5, 169–170. 1934.

[11] *Vogelzug*, 5, 171–172. 1934.

[12] Giersberg, H. and R. Stadie. 1934. Ueber Experimentelle Auslösung des Zugtriebes durch Weibliches Sexualhormon. *Vogelzug*, 5, 173–176.

LONGEVITY

Lapwings (*Vanellus vanellus*) of six and one half[3] and seven and one half[5] years, a Woodcock (*Scolopax r. rusticola*) of six and one half[3] years, a Kestrel (*Falco tinnunculus*) of eight and one half years,[3] and a Starling (*Sturnus v. vulgaris*) of at least nine years[4] are reported in *British Birds*.

A Harris's Sparrow (*Zonotrichia querula*) banded December 23, 1925, has returned to an Iowa banding station every year but one since then until April, 1933.[13]

A female Evening Grosbeak (*Hesperiphona* v. *vespertina*) has reached at least nine years of age, while a Louisiana Heron (*Hydranassa tricolor ruficollis*), banded as a nestling in 1920, was captured and released in its natal colony in 1934.[1]

[13] Calloway, S. 1933. Local Bird-Banding. *Nebraska Bird Review*, 1, 59–60.

ECOLOGY

"The Rôle of Environment in the Life of Birds."—S. C. Kendeigh. 1934. *Ecological Monographs* 4, 299–417.—In this comprehensive survey of environmental factors, the section on temperature is by far the most sign ficant, as might have been expected from the author's previous notable work on the Physiology of the Temperature of Birds. Extended experiments on the resistance of House Sparrows and House Wrens to starvation at different temperatures showed the former more resistant to heat and cold than the latter; the author correlates these findings with the facts that the Sparrow is resident in Ohio, while the Wren is only a summer resident, and also that the breeding-range of *Passer domesticus* extends much farther south than that of *Troglodytes a. aëdon*. Heavier birds survived longer at low temperatures, and lighter birds at high ones. Birds in winter showed much greater resistance at all temperatures except very high ones. Table 14, giving weights of plumages of 181 birds of 21 species during the different seasons, shows that plumage is "heavier in the autumn, both actually and relative to the body weight, than at any other season of the year" (p. 334).

In these findings lies one explanation for the limits of breeding and wintering ranges. "The critical factor involved in the resistance or tolerance of small passerine birds to cold is average night temperature combined with number of hours of darkness. The critical factor involved in the tolerance of birds to heat is the daily maximum air temperature" (pp. 341–342).

Less happy is the attempt to correlate wind-velocity, precipitation, monthly night temperature, etc., with the amount of reproduction among the House Wrens on fifteen acres at Gates Mills, Ohio (Fig. 18). One cannot average temperatures for three months in the breeding season and expect any significant relationship with success in nesting; a cold May and hot July might give the same figure as a warm May and mild July. Each nesting-season must be analyzed in detail—day by day in many cases—if one is to get a clue to the influence of weather. In Fig. 19, however, there seems to be some correlation between survival in winter and average night temperature during winter in the Wren's wintering range.

It is a disappointment that definite figures on survival and reproduction of the Wren population are not given; we need to know how many banded adult males and females returned each year, how many young were fledged each year, and how many returned. The discussion of number of broods per female in relation to the total population is unsatisfactory. Too few pairs are involved each year—six to fourteen—for statistical treatment to be significant.

As to migration, the author believes that a number of factors play a part. "The regulation of migration as to time is controlled in the Spring by rising daily maximum and night temperatures and changing relative proportions daily of light and darkness. In the autumn, decreasing temperatures particularly at night, longer nights and shorter days, and, for some species, decreasing food supply are most important. The conditioning factor that may act directly or indirectly as a stimulus for initiating migration is an excessive change in the metabolic or physiological state of the body" (p. 408).

Dr. Kendeigh shows a wide acquaintance with the literature of his subject. He has done an important piece of work which merits careful study from every one interested in the relation of birds to the environment.

TERRITORY

"The Influence of Territory on the Life of Birds."[14]—A restatement of Howard's thesis as given in "Territory in Bird Life;" no new observations are offered, nor any criticisms.

"Birds and Territory."[15]—An appraisement of the territory theory as follows: historical sketch concerned chiefly with Altum, Moffat, and Howard; criticisms of the theory, especially those of Nicholson and the Lacks; the author's observations on the Song Sparrow and territory; discussion of the aforementioned criticisms; necessity for limiting the theory; suggestions for further study.

"Some Aspects of the Territory Theory."—D. Nethersole-Thompson, 1934. *Oölogists' Record*, 14, 15–23.—The author believes that territory "is not an end in itself, but a means to success in reproduction. And, if such success is more likely to be attained by exclusiveness, the tendency is for territorial boundaries to be maintained, but when food becomes abundant and natural enemies disappear or become uninfluential, such boundaries often tend to disappear until stress of circumstance urge their re-adoption."

Observations on Territory in Finland.—Dr. Palmgren's first paper[16] it largely a review of the work of Howard, Meise, Nicholson, Mousley, and Burkits on territory. In his later paper[17] he discusses Territory Reviewed by D. and L. Lack (see *Bird-Banding*, 1934, 97) in the light of his experiences with a number of species in spruce and birch woods. Chaffinches (*Fringilla cælebs*) and Golden-crested Wrens (*Regulus regulus*) had distinct territories in part of the area, but where the birds were more abundant territories were not so clearly defined. He agrees with the Lacks that "theorizing over territory has been carried much further than the facts warrant," but believes that "territory is something more than the mere 'Song-center' of the male."

[14] Mountfort, G. R. 1934. De l'Influence du Territoire sur la Vie des Oiseaux. *L'Oiseau et la Revue Française d'Ornithologie*, 4, 335–349.

[15] Nice, M. M. 1934. Les Oiseaux et le "Cantonnement." Translated by G. de Vogüé and H. Jouard. *Alauda*, 6, 275–297.

[16] Palmgren, P. 1932. Der Vogel und sein Brutrevier. *Ornis Fennica*, 9, 23–25.

[17] 1933. Die Vogelbestände zweier Wäldchen, nebst Bemerkungen über die Brutreviertheorie und zur Quantitativen Methodik bei Vogelbestandaufnahmen. *Ornis Fennica*, 10, 61–94.

COLOR AND SONG

"The Meaning of Animal Colour and Adornment." R. W. Hingston. 1933. London, Arnold. 411 p.—The thesis of this book is in brief: hostility is the key note of the animal world; color (when not concealing and thus expressing fear) is threatening; and all conspicuous color and song are expressions of anger. With birds "the demonstration before the rival is hostile, the display before the female is hostile, the sex act itself is hostile. And if this is true, then how appallingly great must be the importance of the hostile spirit in creation "(p. 357).

Indeed Major Hingston paints a most unpleasant world, where hate reigns supreme. Of course it is fortunate (for us) that this all-pervading anger has found expression in music and color. Hingston is not an ornithologist, but something of an entomologist. Strangely enough, although he devotes much space to the "fightings" of butterflies, telling how they "fight altogether with their colors," he does not once mention the fact that insects are more or less color-blind.[18] We wonder the author did not write a final chapter showing us that if flowers "did not fight there would be no bright-colored species."

"The Role of Anger in Evolution." F. H. Allen, 1934. *The Auk*, 51, 454-469—This paper discusses at length and criticizes both Hingston's book and A. A Allen's article "Sex Rhythm in the Ruffed Grouse and Other Birds" (*The Auk*, 51, 180–199; reviewed in *Bird-Banding*, 1934, 144). "To ascribe to anger the leading role in the life of the individual or the race seems to imply the ignoring of two much more important factors," *i.e.* the instincts for self-preservation and reproduction. "The reactions that accompany the emotion of anger can in turn serve any one of the three appetites—hunger, thirst, and sex—or the fear reaction."

F. H. Allen is a staunch believer in Darwin's sexual selection theory which is more inclusive than usually realized. On p. 456 he says, "It may be admitted that there is less in the nature of *active* selection on the part of the female than Darwin supposed, but the theory does not demand that. All that is necessary to make it valid is to show that males better equipped in any way than their rivals—in

weapons, courage, strength, attractiveness of coloration, or the power and beauty of their vocal utterances—get mates more readily and hence leave more offspring."

Now does not "better equipped in weapons, courage, strength" agree fairly well with Hingston's and A. A. Allen's ideas? Proponents of both theories believe that superior males are more successful in getting mates than their rivals; the difference of opinion consists in whether this is effected through frightening off other males or attracting females.

On p. 469 F. H. Allen concludes "that sexual selection by means of the conscious or unconscious preferences of the female has played a much more important part [than anger] in the evolution of color, song, and display."

In the sixty-four years since Darwin promulgated his sexual selection theory, there has been a welter of argument, but almost no evidence presented one way or another. I know of only two studies on birds which support the idea of sexual selection: Edmund Selous[19] saw some indication of preference of the handsomer males in the Ruffs (*Philomachus pugnax*), and Hilda Cinat-Tomson [20] found that male Shell Parrakeets (*Melopsittacus undulatus*) with artificially lengthened collars procured mates more quickly than did normal birds.

In my study of the Song Sparrow (*Melospiza melodia beata*) there has been an excellent opportunity to watch this matter with forty to seventy males distinguished with colored bands, all singing for mates that join them from February to April. The males differ slightly in size, and notably in belligerency, in zeal of singing, in beauty of song, and in coloration, since residents are dingy with coal soot and summer residents are bright-colored. After four years' experience, I have no evidence that the female pays the slightest attention to the appearance, character, or singing ability of her mate, nor even to the number of legs he possesses. And it is not that her judgment is prejudiced by the attractions of a superior territory, for she is equally uncritical in this matter also. Old females try to come back to their former territories; otherwise their "choice" of husbands appears to be perfectly haphazard.

Other birds may behave differently, especially where there is marked sexual dimorphism. We need observations and experiments on many, many species.

Arguments against sexual selection in the matter of song and color in birds were well stated by C. B. Moffat thirty years ago.[21] Proof against it has been furnished by Noble in the case of many species of lizards[22] for he found that male lizards "endowed with handsome liveries displayed these adornments to good effect not to attract females, but to intimidate rival males"[23], and concludes, "Since females are not attracted while males are definitely repulsed by color displays, it follows that female choice has played no part in the genesis of male adornment."[22]

So Hingston is not far wrong in so far as lizards are concerned. But the whole world—fortunately—is not made up of lizards. Hingston has a germ of truth in his theories, but he carries them to fantastic lengths. In conclusion, may I suggest that we are suffering from a maximum of theory to a minimum of fact, and that we cannot extricate our thinking processes until we reverse the proportions.

[18] Lutz, F. E. 1933. "Invisible" Colors of Flowers and Butterflies. *Natural History*, 33, 565–576.

[19] 1906. *Zoölogist*, 10, 201–219, 285–294, 419–428.

[20] 1926. Die Geschlechtliche Zuchtwahl beim Wellensittich (*Melopsittacus undulatus* Shaw). *Biolog. Zentralblatt*, 46, 543–552.

[21] 1903. The Spring Rivalry of Birds. *Irish Naturalist*, 12, 152–166.

[22] Noble, G. K. and H. T. Bradley, 1933. The Mating Behavior of Lizzards; its Bearing on the Theory of Sexual Selection. *Ann. N.Y. Acad. Sci.* 35, 25–100.

[23] Noble, G. K. 1934. Experimenting with the Courtship of Lizards. *Natural History*, 34, 3–15.

LIFE-HISTORY

More on the Corn-Bunting.[24]—Col. and Mrs. Ryves spent another season on *Emberiza c. calandra* (see. *Bird-Banding*, 1934, 202) and found an even more astonishing situation in regard to polygamy than before. Each of the fifteen males

studied proved to be polygamous, having from two to seven mates apiece—a total of fifty-one. On July 14th on the territory of the male with seven mates "four hens were watched building at the same time. . . . Each had her special hunting ground for materials, and none ever clashed. The male was beside himself with excitement, and seemed quite bewildered upon which of them to lavish his attentions!" The last "five (practically) contemporaneous nests were placed within a circle of a radius of about fifteen yards." All the eggs but one hatched. The young of the nests of the first two hens left July 19th and 20th, while those of the later nests left August 10th to 13th, at which time they were being fed not only by their mothers, but by a number of full-grown young birds. "Throughout our observations of this territory, from start to finish, never once was the male seen to help any of his hens except the one owning the first nest found."

Terns Remating.[25]—Two pairs of Common Terns (*Sterna h. hirundo*) that had been banded as mates in 1932 on an island near Helgoland were found to be again mates in 1934.

Same Mates for Six Years.[26]—The same pair of Welcome Swallows nested thirteen times from March, 1928, to September, 1933, on the roof of the Mission House in Vuatom, New Guinea, usually building in February or March, and again in July or August. Thirty-two eggs were laid from which twenty-three young were fledged, from one to eight young being raised each year. Father Meyer writes me that this bird holds territory from which it drives off all others of its species; that he was sure of the identity of his pair through their tameness and idiosyncracies, and that after the eggs were laid in January, 1934, one of the pair was killed by a cat, the other getting a new and timid mate.

[24] 1934. Supplementary Notes on the Breeding-habits of the Corn-Bunting as Observed in North Cornwall in 1934. *British Birds*, 28, 154–164.

[25] Albertsen, W., 1934. Gattentreue bei der Flussseeschwalbe, *Sterna h. hirundo* L. *Vogelzug*, 5, 192.

[26] Meyer, O. 1934. Brüten von Hirundo tahitica frontalis Q.u.G. *Beiträge zur Fortpflanzungsbiologie der Vögel*, 10, 141–143.

NESTING SUCCESS

"Nest Mortality."—S. Baron, 1934. *British Birds*, 28, 77.—In Lincolnshire during April, 1934, under "fairly favorable weather" conditions, in 71 nests of 11 species (all Passerine but Wood-pigeons and two species of Owls) 265 eggs were laid, 160 young hatched, and 124 fledged—46.7 per cent of success. This figure agrees well with what I found with Song Sparrows,[27, 28] and also with six other studies of birds most of which nest in the open (cited in 27 and 28), the percentage of fledged young ranging from 40.5 to 45.1 of the number of eggs laid.

In various hole-nesting species, however, the percentage is consistently higher. This is true of the House Wren at Gates Mill, Ohio, where 68 per cent of 133 nests "were successful in rearing young" (Kendeigh, *Role of the Environment*) and of Tree Swallows (*Iridoprocne bicolor*) on Cape Cod, where the percentage of success for 278 eggs in 1931 was 56.5 per cent,[29] and for 671 eggs in 1932, 60 per cent.[30] The publications of the Phytopathological Service at Wageningen, Holland, offer a wealth of data on hole-nesting birds,[31, 32] chiefly Titmice, but also Starlings and Redstarts (*Phœnicurus phœnicurus*); the percentages of success ranging from 55 to 76, but the great majority of cases falling near 65.

It is evident that birds nesting in the open suffer from many more disasters than those nesting in holes; how do the former keep up their numbers? In many cases they raise more broods than the hole-nesters, although this is not universally true.

The Corn-Buntings studied by the Ryveses show a very high percentage of success for ground-nesting birds—61 per cent in 1933 (Colonel Ryves has called my attention to an error in arithmetic in the previous review) and 67.3 per cent for 214 eggs and young in 1934.[24] However, as Colonel Ryves has pointed out in

his letter, this figure is a little too high, for the nests found with young may originally have held more eggs. These birds are typically single-brooded; their late nesting-date—chiefly July—is evidently more favorable than one early in the season.

[27] 1933. *Bird-Banding*, 4, p. 124.

[28] 1934. *Journal für Ornithologie*, 82, p. 68.

[29] Austin, O. L., Jr., and S. H. Low. 1932. Notes on the Breeding of the Tree Swallow. *Bird-Banding*, 3, 39–44.

[30] Low, S. H. 1933. Further Notes on the Nesting of the Tree Swallow. *Bird-Banding*, 4, 76–87.

[31] Wolda, G. 1929. Verslag van de Ornithologische Afdeeling over het Jaar 1928. 27 p.

[32] Ten Dutch papers reviewed by M. M. Nice. 1934. *Wilson Bulletin*, 46, 130–132.

BIRD BEHAVIOR

"The Instinctive Emotional Life of Birds." Friedmann. 1934. *Psychoanalytic Review*, 21, Nos. 3 & 4, 1–57.—Two classes of emotions are distinguished: "permanent emotions"—fear, greed, gregariousness or the lack of it, and sometimes cruelty; and "cyclical emotions" that "have to do with courtship, mating, and care of the young." For quite a different view of emotions and instincts the reader should consult E. C. Tolman's "Purposive Behavior in Animals and Men," 1932, New York, Century Co., especially pp. 208–306 (with ample reference to the glossary).

"Flock Organization of the Shell Parrakeet (*Melopsittacus undulatus* Shaw)" R. H. Masure and W. C. Allee, 1934. *Ecology*, 15, 388–398.—Peck-dominance rather than peck-right exists with these birds in captivity. "In non-breeding hetero-sexual flocks, the females are dominant over the males. In breeding and nesting birds, the males are dominant." The same condition obtains with many Parrots and Parrakeets. The authors speculate on the question as to the "survival value of high social position in periods of food shortage or other forms of environmental stress."

The Egg as a Brood-Object.[33]—Experiments were made with the Arctic Tern (*Sterna macrura = paradisæa*) in Greenland by exchanging eggs with those of other species and placing eggs ten centimeters (about four inches) from the nest-rim. The author found somewhat differing behavoir with different birds, but concludes that the nest-site has a strong attraction; that eggs exert both visual and tactual stimuli on the incubating bird; and that eggs of unlike size and color serve as brood-objects, but do not exert as strong a stimulus as eggs of the same species.

[33] Tinbergen, E. 1934. Enkele Proeven over het ei als Broedobject. *Ardea*, 23, 82–89.

BOOKS

"Aves." E. Stresemann. 1934. Kuckenthal-Krumbach, Handbuch der Zoologie, Bd. VII, 2. Hälfte, 899 p.—Ornithologists will welcome the completion of this classic work on birds, the first volume of which appeared in 1927. The present and eighth volume continues the discussion of the classification of birds, giving a summarized account of the characteristics of the different orders and families. Twenty-seven pages are devoted to a bibliography of the most important books and articles in the whole field of ornithology arranged by topics, while an index and table of contents complete the volume.

Too often there have been two mutually exclusive fields in the study of birds—the museum and out-of-doors; many a museum man knows little about birds in nature, while many a field man knows little of what any other person has discovered. Dr. Stresemann is both a scholar and a naturalist; he is a great systematist, he has an astonishing grasp of the literature, and he knows birds in life. Moreover, he has a keenly discriminating appreciation of the significant in research. In "Aves" he treats in a masterly way of the multifarious phases of ornithology—anatomy, physiology, systematics, migration, life-history, etc., etc. This comprehensive work is an essential reference book for the serious student.

"The Life of the Rook." G. K. Yeates. 1934. London, Allan. 10s 6d.—An interesting study of a most interesting bird, *Corvus frugilegus*, concerned chiefly with observations from a blind in a nesting-tree. Although an expert photographer Mr. Yeates is primarily a bird-student, for he states, "Gradually my method became to set my attention upon one particular point, watch for it, take notes upon it, and then try to illustrate it with the camera when next it occurred." A chapter on Tree-top Photography gives practical advice including plans for a "Permanent Tree Hide." The Life of the Rook is handsomely got up, well written, and furnished with excellent photographs.

"Quest for Birds." W. K. Richmond. 1934. London, Witherby. 10s 6d net.—Mr. Richmond is happy in his chapters on seeing birds—on a common, in an Essex estuary, and other places; he is a field naturalist *par excellence*, and his terse, vivid descriptions inspire the reader with a keen desire to go out and see for himself these delightful and wonderful birds. This, I suppose, is the aim of most books on nature, but how few attain it!

Practically all species of birds, the author believes, have decreased in England, and a strong plea is made for protection. His words apply equally to our country: "By this process of continual impoverishment England has become a land of small birds." "Even if the actual bird-population of our country is not much smaller than it was five hundred years ago—even if it were greater, we have no consolation for the fact that it has become immeasurably less balanced, less rich and varied than it was in the days gone by."

It is a pity that a book of such charm should be marred by belligerent theorizing; Mr. Richmond is distinctly out of his depth in this field.

"Bird City." E. A. McIlhenny. 1934. Boston, Christopher. $3.00.—This is the tale of a splendid achievement of practical bird-protection from a start in 1893 with eight young Snowy Egrets to a "city" containing multitudes of Herons of six species besides countless other water-birds. The story is told in didactic style, evidently to appeal to children and beginners in nature study. Let us hope that the book will stimulae others to follow Mr. McIlhenny's example and provide more such superb refuges for wild life.

"Eskimo Year: a Naturalist's Adventures in the Far North." G. M. Sutton. 1934. New York, Macmillan. $3.00—In informal style with many humorous touches, the author tells us of the sixty ptarmigan that roosted in his tracks in the snow; of the hardships and thrills of a husky's life; of the excitements of playing Five Hundred and Snap with Eskimo companions; of his attack of *Dementia Tundra* when spring came at last; of the confiding ways of a pet lemming, of the sanctuary given to the gentle Snow Buntings, and many, many other things. Dr. Sutton is an artist with his pen as well as his pencil. He is also one of that best type of naturalist who feel a deep and true friendship for nature, including primitive man, as well as beasts and birds.

"Perdix the Partridge." Leslie Sprake. 1934. London, Witherby. 6s. net. (Reviewed by L. E. Hicks).—The Hungarian Partridge has been the second most successful of all the game-birds introduced into America. The present book is well written and gives an authoritative treatment of life-history, propagation, management, and harvest in the annual shoots. Americans will be interested in contrasting *Perdix perdix* as found in Europe with the introduced bird in this country. This book should have particular appeal to sportsmen who hunt grouse, game-propagators, game-managers, and students interested in the life-histories of gallinaceous birds.